



VERIFICATION REPORT

Recipe for Change Grouped Project



Document Prepared By

TÜV SÜD South Asia Pvt Ltd

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Summary:

TÜV SÜD South Asia Pvt. Ltd. has performed the second verification of the VCS project activity. The verification is based on the currently valid documentation of the VCS and United Nations Framework Convention on Climate Change (UNFCCC).

The Verification has been conducted for the monitoring period 01/04/2021 to 30/04/2022.

Six new instances RfC PA 10 – RfC PA 15 have been included along with verification. Also, PP has applied for the deviation in the monitoring plan, which has been assessed in this verification report.

The verification process includes three phases:

- Desk review of documents.
- Off-site audit and follow-up interviews with the relevant personnel.
- Resolution of outstanding issues and the issuance of final verification report and opinion.

The verification includes confirming the implementation of the monitoring plan of the registered VCS grouped project (reference number: 2384) and the application of the monitoring methodology as per AMS-II.C. version 15: “Demand-side energy efficiency activities for specific technologies” and AMS-II.G. version 11.1: “Energy efficiency measures in thermal applications of non-renewable biomass”.

In the Republic of South Africa, the Grouped Project involves the distribution of heat retention cooking devices in kitchens. The project has health, social, environmental and climate benefits correlated in reducing the amount of fossil fuels, electricity and non-renewable biomass

consumption used for cooking. Greenhouse gas emissions will gradually decrease through reduction in fossil fuel / electricity / biomass consumption.

The Grouped project consists of fifteen small-scale Project Activity Instances, that contain a maximum bag of 20,000 each, which were implemented during the monitoring period. There was a distribution of 300,000 bags into the field.

The total emission reductions from the “Recipe for Change Grouped Project” claimed by the PP during the monitoring period amount to 180,076 tCO₂e.

6 Clarification Requests (CLs) and 1 CARs have been raised during verification process has been successfully closed. Also, one Forward Action Request (FAR) was raised during this monitoring period.

VVB confirms that the project is implemented in accordance with the registered VCS-PD. The monitoring plan complies with the applied methodology AMS II.C, version 15 and AMS II.G., version 11.1 and the monitoring has been carried out in accordance with the monitoring plan in the registered PD. The monitoring system is in place and the emission reductions are calculated without material misstatements. The level of assurance of the verification is reasonable. Our opinion relates to the project's GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information reviewed and evaluated, VVB confirms that the implementation of the project has resulted in 180,076 tCO₂e emission reductions during period 01/04/2021 to 30/04/2022.

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1 INTRODUCTION

1.1 Objective

TÜV SÜD has been commissioned by the client to perform an independent verification assessment.

The objective of the verification work is to comply with the requirements of Verified Carbon Standards requirements. According to this assessment TÜV SÜD shall:

- ✓ Ensure that the project activity has been implemented and operated as per the registered PD, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- ✓ Ensure that the published MR and other supporting documents provided are complete, verifiable and in accordance with applicable VCS and CDM VVS requirements,
- ✓ Ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- ✓ Evaluate the data recorded and stored as per the applicable requirements.
- ✓ Assessment of the sustainability monitoring parameters as per the VCS requirements.

1.2 Scope and Criteria

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of VCS project activities, the scope is set by:

- ✓ VCS v4.3 requirements.
- ✓ Clean Development Mechanism Validation and Verification Standard (VVS) for Project Activities v3.0.
- ✓ Baselines and monitoring methodologies (including GHG inventories).
- ✓ Environmental issues relevant to the applicable sectoral scope.
- ✓ Current technical and operational knowledge of the specific sectoral scope and information on best practice.

✓ Stakeholder consultation and feedback

The verification process is not meant to provide any form of consulting for the project participant (PP). However, stated requests for clarifications, corrective actions, and/or forward actions may provide input for improvement of the project design.

1.3 Level of Assurance

The errors identified in the project are below the threshold limit of materiality and hence not material. The GHG emission reductions are calculated without material misstatements.

The VVB confirms that a reasonable level of assurance has been achieved during the verification process.

1.4 Summary Description of the Project

The Grouped Project “Recipe for Change Grouped Project” (RfC PA 1 to RfC PA 15), employs two different small-scale baseline and monitoring methodologies i.e., AMS-II.C. version 15 and AMS-II.G. version 11.1. The Grouped Project is managed by Wonderbag UK Limited.

In the Republic of South Africa, the Grouped Project involves the distribution of heat retention cooking devices in kitchens. The project has health, social, environmental and climate benefits correlated in reducing the amount of fossil fuels, electricity and non-renewable biomass consumption used for cooking. Greenhouse gas emissions will gradually decrease through reduction in fossil fuel / electricity / biomass consumption.

The Grouped Project was implemented which consists of fifteen small-scale Project Activity Instances, that contain a maximum bag of 20,000 each during the monitoring period. There was a distribution of 300,000 bags into the field in this monitoring period.

This monitoring period is from 01-April-2021 to 30-April-2022, which is within the first crediting period. During this monitoring period, the total emission reductions claimed by the PP are 180,076 tCO₂e.

The Project Activity Instances can be renewed twice which has a seven-year renewable crediting periods. The project’s first crediting period under VCS program is from 15-March-2019 to 14-March-2026.

The assessment team has checked the verification records and interviewed the PP's representatives (telephonically) to verify the project details. Based on the assessment of the documents and remote interviews with PP's representatives, the assessment team is able to confirm that the project activity is fully functional and implemented.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The information provided by the project participants is assessed by applying the means of verification specified in the VCS v4.3, Toolkit and the VVS.

A competent assessment team is selected prior to the start of the verification. The team is selected to cover the technical area(s), sectoral scope(s) and relevant host country experience for evaluating the VCS project activity. Additionally, a competent Technical Reviewer or Technical Reviewer Team is appointed to conduct checks on quality and completeness.

The verification team and the technical reviewers consist of the following personnel:

Role/Qualification	Last Name	First Name	Country
VCS Team Leader	Kewat	Shailendra	India
Trainees	Chauhan	Ankita	India
Technical Reviewer	Sudheendra	K	India

The verification team performs first a desk review, followed by a remote-site visit, which results in the formation of a draft report and a list of findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control by the VVB before submission to the VCS.

2.2 Document Review

The documents referred during this verification are provided in Appendix 1.

2.3 Interviews

The VVB has not conducted the on-site inspection for this current monitoring period due to obligations imposed by COVID 19. However, the VVB has ensured that reasonable level of assurance has been achieved as per Verra regulations on the relaxation of mandatory site visits by the VVB due to COVID 19. The VVB has conducted telephonic interviews and video calls to discuss with the client regarding the data and documents pertaining to the current verification period. The interview was conducted on 28/06/2022 and sample based beneficiaries interviewed on 29/06/2022 and discussions were conducted successfully.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Tuchten	Olivia	Promethium Carbon	28/06/2022	Implementation and monitoring	Shailendra Kewat & Ankita Chauhan
2	Collins	Sarah	Wonderbag UK Limited	28/06/2022	Technology, distributions and monitoring	Shailendra Kewat & Ankita Chauhan
3	Slabbert	Kenneth	Promethium Carbon	28/06/2022	Implementation, sampling, ER calculations and monitoring	Shailendra Kewat & Ankita Chauhan
4	Govender	Sathiesh	GRG Analytix (Pty) Ltd	28/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
5	Meyiwa:	Loraine	Field surveyor, GRG Analytix (Pty) Ltd	28/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
6	Njoko	Nothando	Field surveyor, GRG Analytix (Pty) Ltd	29/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
7	Mahlangu	Goodwell	Field surveyor, GRG Analytix (Pty) Ltd	29/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
8	Mahlangu	Devanna	Field surveyor, GRG Analytix (Pty) Ltd	29/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
9	Raphalani	Ernest	Field surveyor, GRG Analytix (Pty) Ltd	29/06/2022	Monitoring, User habit survey	Shailendra Kewat & Ankita Chauhan
10	Mnguni	Terresa	Beneficiary	28/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan
11	Mbhele	Nomfundo	Beneficiary	28/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan

12	Govuza	Nolulamo	Beneficiary	28/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan
13	Mncwabe	Sihle	Beneficiary	29/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan
14	Maduna	Lulama	Beneficiary	29/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan
15	May	Ylonda	Beneficiary	29/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan
16	Naidoo	Samantha	Beneficiary	29/06/2022	Local stakeholders using Wonderbags	Shailendra Kewat & Ankita Chauhan

2.4 Site Inspections

VVB has not conducted an on-site inspection due to the recent pandemic COVID19 and due to its related policy measures created restrictions all over the world impacting travel activities on an international level and even for in-country travel.

A reasonable level of assurance has been maintained through the alternative means used for the purpose of verification as follows:

- 1) An assessment of the implementation and operation of the project activity as per the registered VCS PD
- 2) A review of information aggregating and reporting of the monitoring parameters

- 3) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP
- 4) A cross-check between product distribution information provided in the MR and data from other sources.
- 5) A check of the monitoring equipment and observations of monitoring practices against the requirements of the VCS PD and the applied monitoring methodologies
- 6) A review of calculations and assumptions made in determining the GHG data and ERs, and
- 7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

Samples were conducted for each fuel type listed in the baseline scenario; this results in one strata for each fuel. The statistical analyses on strata sample size and results were conducted independently of each other. This ensures that results from the strata do not affect each other.

Samples were selected for each stratum, based on the information about household fuel use in the Wonderbag database. The results of the surveys were applied to all Wonderbags that use that particular fuel type. VVB has cross verified this & found ok.

In line with paragraph 26 of the Sampling Standard, the verification team has applied acceptance sampling approach through remote interviews on the Wonderbag user habit survey as part of verification. The project participant had applied sampling approach. A representative Monitoring survey was conducted by the representatives of Project participant.

The verification team has chosen acceptance sampling in accordance with paragraph 28 of the sampling standard. Applying paragraph 39 of the sampling standard, version 08, a sample size of 12 households was chosen (with one discrepant records). A sample size of 12 was determined, based on an AQL of 1.0% and UQL of 20%, producer risk 10% and consumer risk 10%. Acceptance number thus determined for the sample is 1.

However, VVB interviewed 22 samples from the user habit survey done by project participants. The information provided in the User habit survey data, has been cross checked during the remote interviews conducted.

User habit survey results did not meet the required precision level of 10%.

Hence, as per Sampling and surveys for CDM project activities and programmes of activities, version -08, para 18

If the estimates from the actual samples fail to achieve the target minimum levels of precision, the project participants or the coordinating/managing entity shall either:

(a) Perform additional data collection that is a supplemental or new sample to reach the required precision level; or

(b) Apply a correction to the estimates using one of the two options below:

(i) Discounting the emission reduction estimates by either: a. Taking the lower or the upper bound, whatever is the more conservative, of the 90 or 95 per cent confidence interval, depending on the type of methodologies applied; or

(ii). Discounting by no less than three times (x3) the percentage precision points missed (e.g. if the required precision is 90/10 and the attained precision is 90/11 then the GHG emission reduction estimates are discounted by 3 per cent);

Hence, PP has used upper bound values of the fuel usage from survey results in the emission reduction calculations.

The use of the upper bound is the most conservative approach because it assumes that the surveyed households made use of higher quantities of fuels compared to the lower bound values, hence VVB found it more conservative and appropriate.

The verification team carried out remote interviews with representatives of PP in order to assess the information included in the monitoring report and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

2.5 Resolution of Findings

As an outcome of the verification process, the team can raise different types of findings. Where a non-conformance arises the assessment team shall raise a Corrective Action Request (CAR).

A CAR is issued, where:

- a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- b) Modifications to the implementation, operation and monitoring of the project activity has not been sufficiently documented by the project participants;

- c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

The assessment team shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.

There are 06 CLs and 01 CARs raised during the verification process. Please see Appendix-2 for the details.

2.5.1 Forward Action Requests

One FAR has been raised during this verification and detailed in appendix - 2

2.6 Eligibility for Validation Activities

The project activity falls under sectoral scope 03 and TÜV SÜD is accredited for validation /verification of project activities under this scope.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The VVB confirms that the project is registered only under VCS and not registered in any other GHG program, such as CDM, JI, the Climate Action Reserve, Biocarbon Registry, International Carbon Registry, Gold Standard for Global Goals (GS4GG), and Global Carbon Council (GCC).

3.2 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.3 Project Description Deviations

The project description deviation applied during this monitoring period is a deviation related to the monitoring of electricity and gas (LPG) used for cooking, with a Wonderbag.

Description of the deviation:

For electricity use:

As per Section 5.3.1 of the Project Description requires that “Field researchers visit and interview the Wonderbag users identified in the random sample-target population during the respective surveys.” The cooking fuels were measured physically by the field researchers over a specified number of days during the site visits.

However, during the onsite visits no physical measurements of electricity were taken. This is because the measurement of electricity in the context of the project would require the use of electricity meters, to measure cooking time, which is not economically feasible nor practical.

Hence, PP has calculated electricity emission reductions is based on the amount of time (X minutes) that the food is cooked on a stove top, multiplied by a default maximum electric stove power rating (1.5 kW).

VVB found this method more conservative and accurate than taking the full daily electricity readings of a household, as electricity is used for other activities as well.

For Gas (LPG) use:

PP has requested deviation regarding the survey for gas users via electronic communication instead of costly and time-intensive physical visits. The same has been cross verified & accepted.

During user habit survey PP has identified the deviation in monitoring plan regarding the gas bottles were being used for activities other than the cooking.

As a result, the users were contacted by telephone and asked to give details on their gas stove, the time taken in typical number of minutes that their pot spends when cooking food, prior to being placed in a Wonderbag for further cooking.

The same approach was applied as calculating electricity consumption. The minutes spent cooking food on the gas stove plate was multiplied by a default power rating for a gas stove plate (3kW).

VVB found this method more conservative and accurate than taking the full bottle of gas per household, since gas might be used for other activities as well, Also, VVB has verified the manufacturer technical specification of the gas stove, which states the default power rating 3kW.

In the current monitoring period this deviation was applied only to gas users. As per this deviation, the gas-users of 145 surveys were contacted telephonically to survey gas used for cooking purposes. As per the registered monitoring plan in the Project Description, the remaining 757 surveys of other fuel users (e.g. coal, paraffin, electricity and LPG) users were completed in person.

From the next monitoring period the new approach will employ telephone/electronic communication surveys which will be applied to electricity and gas users.

Impact on emission reductions: The deviation does not negatively impact the conservativeness of the quantification of greenhouse gas emission reductions:

In the case of emission reductions from households that use LPG cooking fuel:

PP has derived the data sets from sampling method, telephonic interview & led to a higher variability from the physical surveys undertaken in the monitoring period. As a result upper bound value of the User Habit Survey results were used in the emission reduction calculations, per cooking fuel, where the precision was not met.

User habit survey results did not meet the required precision level of 10%.

Hence, as per Sampling and surveys for CDM project activities and programmes of activities, version -08, para 18

If the estimates from the actual samples fail to achieve the target minimum levels of precision, the project participants or the coordinating/managing entity shall either:

(a) Perform additional data collection that is a supplemental or new sample to reach the required precision level; or

(b) Apply a correction to the estimates using one of the two options below:

(i) Discounting the emission reduction estimates by either: a. Taking the lower or the upper bound, whatever is the more conservative, of the 90 or 95 per cent confidence interval, depending on the type of methodologies applied; or

(ii). Discounting by no less than three times (x3) the percentage precision points missed (e.g. if the required precision is 90/10 and the attained precision is 90/11 then the GHG emission reduction estimates are discounted by 3 per cent);

Hence, PP has used upper bound values of the fuel usage from survey results in the emission reduction calculations.

The use of the upper bound is the most conservative approach because it assumes that the surveyed households made use of higher quantities of fuels compared to the lower bound values, hence VVB found it more conservative and appropriate.

Scope of deviation: The deviation only relates to the procedure for monitoring and measurement of cooking fuels. VVB has cross verified the same & found ok.

The verification team confirms that the above deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario.

The verification team confirms that the above deviation is appropriately described and justified in the Monitoring report and the project remains in compliance with the VCS rules and hence the deviation is deemed valid and acceptable.

3.4 Grouped Project

The number of new project activity instances added to the project in this verification period consist of six project activity instances which have been verified during the monitoring period (RfC PA 10 to RfC PA 15). The Project Activity Instances comprises a maximum of 20,000 bags per Project Activity Instances and are very similar in nature. They are distributed in South Africa in communities and comprise the same technology where the heat-retaining Wonderbag uses either electricity, coal, paraffin, LPG or biomass as cooking fuels. All the bags were manufactured and distributed either by Wonderbag or by distributing parties. Results from the user habit survey has been applied into the instances. VVB has applied the sampling to cross verify the new instances included and monitoring parameters, details can be found in the section 2.4.

Eligibility Criteria for New Project Activity Instances: The eligibility criteria of the first Project Activity Instance, RfC PA 1, was established at the group project validation. The eligibility of RfC PA 2 – RfC PA 9 was established in the previous verification. Hence, verification team has assessed the eligibility criteria for the instances RfC PA 10 – RfC PA 15.

The assessment team has reviewed the evidences collected by the PP for each of the PA included in this verification and confirmed the following;

- Implementation and operational status of the PA
- Monitoring and data collection
- Flow of information; generating, aggregating and reporting of the monitoring parameters
- Conformance of the new project activity instances with the eligibility criteria set out in the project description

The verification team assessed the appropriateness of new project activity instances (added to the grouped project after validation) against the requirements of the following key elements defined in section 3.2.11 of the Validation and Verification Manual (version 3.2):

	Key Element	Requirements	VVB Assessment
1.	Geographical boundaries: all new project activity instances	VVBs must ensure that the PD clearly identifies the geographic	The verification team reviewed the distribution

	Key Element	Requirements	VVB Assessment
	must be located within the boundary of the Republic of South Africa.	areas within which new instances may be added and must be defined using geodetic polygons and provided in a KML file. Such geographic areas need not be contiguous and may be large or small, noting the grouped project requirements for additionality and baseline assessments of the geographic area.	database and by further conducting interviews with representatives of PP to confirm that all new project activity instances are located within the host country of Republic of South Africa in the registered VCS PD. This is deemed appropriate to the verification team and the requirements of this key element are met.
2.	Identification of baseline scenario and demonstration of additionality	The assessment of baseline scenario and additionality is based upon the initial instances included within each geographic area. VVBs must ensure that, for each project activity, a single baseline scenario exists for each geographic area and for each project activity that additionality is demonstrated across the entirety of each geographic area. Failing this, VVBs must require that the geographic areas are redefined such that the requirements are met. As with projects with multiple instances, project activity instances within a grouped project should be part of the same investment decision if they are to be included in a single project.	The verification team conducted interviews with representatives of PP, reviewed the distribution record database, and further based on its sectoral expertise confirms that baseline scenario for each project technology and geographic area, as identified in section 3.4 of the VCS PD. It is applicable to the corresponding new project activity instances under the specific technology. In addition, the verification team further confirms that each new project activity instance included within the grouped project follows the additionality. Thus, it has been demonstrated that each project activity instance included in grouped

	Key Element	Requirements	VVB Assessment
			project is additional. Additionality is proven at the Grouped Project level as per section 3.5 of the RfC PD, which states that "Accordingly, the cost analysis above demonstrates additionality at the grouped project level" • Baseline scenario exists (corresponding to the project technology) • the requirements of additionality are being complied with for the entirety of geographic area (Republic of South Africa) within which they are installed. This is deemed appropriate to the verification team and the requirements of this key element have been met by all the new project activity instances added to the grouped project.
3.	Eligibility criteria	VVBs must ensure that an appropriate set of criteria are set for each combination of project activity and geographic area. The criteria are used to validate new project activity instances, essentially serving as a checklist to determine whether the instances share the same attributes as the initial set of	PP has provided the applicability of each of the eligibility criteria for all the project instances in section 3.3 of the MR which is in compliance with the VCS PD. Based on the assessment provided, the verification team concludes that each new project activity

	Key Element	Requirements	VVB Assessment
		validated project activities instances. For example, eligibility criteria for grouped projects implementing CFLs may state that new instances must be installed in grid-connected households and the CFLs must be at least 30 percent more expensive compared to conventional incandescent bulbs. In general, VVBs must ensure that the eligibility criteria are developed sufficiently that such determinations could be made when validating new instances. Eligibility criteria must also conform to any restrictions set out in the methodologies applied.	instance meets the appropriate set of eligibility criteria (as defined in VCS PD) and thus shares the same attributes as the initial set of validated project activity instances. Thus, the verification team deems them to be appropriate for inclusion in the grouped project. Thus, the requirements of this key element have been met by all the new project activity instances added to the grouped project.
4.	Monitoring and GHG information system	VVBs must ensure the sampling plan is able to initiate statistically significant outcomes and also ensures that the project has an appropriate monitoring plan that includes a sampling plan to collect data from all project activity instances and information systems, allowing for centralized data collection.	The verification team reviewed the VCS MR and additionally, conducted interviews with representatives of PP to confirm that the monitoring plan and procedures mentioned therein (which includes the sampling plan) is in conformance to the requirements laid out in the VCS PD. A deviation in the registered monitoring plan is applied and assessed in the section 3.3. Moreover, according to the monitoring plan the

	Key Element	Requirements	VVB Assessment
			PP is responsible for collecting and storing data. The verification team further confirms that new project activity instances will confirm to the monitoring plan requirements and procedures stated therein. However, as per specific requirements of the applied methodologies AMS-II.C and AMS-II.G., sampling for monitoring the project under methodologies has taken place during the current monitoring period. Based on the review of the applied methodologies and VCS PD, this is deemed to be acceptable to the verification team. Refer to section 4.1 below for detailed discussion on monitoring activities. This is deemed appropriate to the verification team. Thus, the requirements of this key element have been met by all the new project activity instances added to the grouped project.
5.	Methodology	Grouped projects can apply methodologies other than those designed specifically for grouped projects. When reviewing the VVBs must be mindful of any capacity limits	The verification team reviewed the MR, sample distribution records for new project activity instances and spreadsheets and further

	Key Element	Requirements	VVB Assessment
		applicable to the methodology and need to ensure that project activity instances and clusters adhere to such capacity limits; the grouped project as a whole may exceed the capacity limit.	conducted interviews with representatives of PP to confirm that all new project activity instances comply with the requirements of their respective applied methodologies. Additionally, it is confirmed that no methodologies other than those designed specifically for grouped projects have been applied and all new project activity instances comply with the respective capacity limits as per the applied methodologies. This is deemed appropriate to the verification team. Thus, the requirements of this key element have been met by all the new project activity instances added to the grouped project.

Based on the above assessment the verification team confirms that inclusion of new project activity instances in the grouped project is valid.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The Grouped Project, “Recipe for Change Grouped Project” is submitted to VERRA as a VCS project on (VCS Project ID 2384) applying the two methodologies AMS-II.C (version 15) “Demand-side energy efficiency activities for specific technologies”, and AMS-II.G. (version

11.1) “Energy efficiency measures in thermal applications of non-renewable biomass”. Throughout the Republic of South Africa, the project involves distribution of Heat retention cooking devices in kitchens. The grouped project consists of fifteen small-scale Project Activity Instances and each of the fifteen PAI consist of 20,000 Wonderbags. Through the uses of cooking the project results in reducing the amount of fossil fuels, electricity and non-renewable biomass leading to the decrease of greenhouse gas emissions.

The Project Activity Instances are located across the Republic of South Africa,

GPS coordinates for the provinces are as follows:

- Western Cape: -32.42, 21.92
- Eastern Cape: -32.09, 26.40
- KwaZulu-Natal: -28.31, 30.92
- Mpumalanga: -25.56, 30.53
- Limpopo -23.29, 29.40
- North-West: -26.54, 25.31
- Gauteng: -26.14, 28.14
- Free State: -28.45, 26.80
- Northern Cape: -29.04, 21.86

The following table outlines the provinces, per Project Activity Instance, where Wonderbags have been distributed:

Project Activity Instance	Province
RfC1, RfC2, RfC3, RfC4, RfC5, RfC6, RfC7, RfC9, RfC10, RfC11, RfC12, RfC13, RfC14	1. Eastern Cape 2. Free State 3. Gauteng 4. KwaZulu Natal 5. Limpopo 6. Mpumalanga 7. North West 8. Northern Cape 9. Western Cape
RfC8	1. Eastern Cape 2. Free State 3. Gauteng 4. KwaZulu Natal 5. Limpopo 6. Mpumalanga

	7. Western Cape
RfC15	1. Eastern Cape 2. Free State 3. Gauteng 4. KwaZulu Natal 5. Mpumalanga 6. North West 7. Northern Cape 8. Western Cape

The coordinates have been cross verified with the google map.

The verification team confirms that there is no change from the registered VCS PD of the physical features which may impact the emission reductions of the project activity. This has been confirmed based on the review of distribution records, conducting interviews with representatives of PP as well as by carrying out remote interviews with end users. Thus, the verification team concludes all the physical features of the VCS grouped project in the registered VCS PD are in place.

The verification team confirms that during the current monitoring period (01/04/2021 to 30/04/2022) the VCS grouped project has distributed 300,000 Wonderbags into the field. This was confirmed based on the review of distribution records and further based on interviews with representatives of PP through remote interviews. During the remote interviews verification, QA/QC procedures were identified which demonstrate that: data were centralized; operational and management system of the grouped project are in place; monitoring data were crosschecked with the distribution records stored and confirmation that all operational staff were trained before taking up positions. The verification team thus confirmed that the monitoring of the project activity has been implemented in accordance with the monitoring plan in the registered VCS PD and responsibility of monitoring is done through third party. During the remote interviews, monitoring, data collection and reporting procedures were confirmed with the relevant staff and through document review of samples of all relevant records.

The verification team confirms that the monitoring plan is in accordance with UNFCCC approved methodologies AMS-II.C (version 15) and AMS-II.G. (version 11.1) after considering the approved methodology deviations and the current monitoring period. All data are collected and archived in accordance with the applied methodologies and included in the monitoring plan.

This was confirmed based on the remote interviews with representatives of PP and upon further review of samples of all relevant records.

All the ex-ante parameters which are used in the calculation of emission reductions are consistent with the VCS PD. It is confirmed that ex-ante parameters mentioned in section 4.1 of the MR are in line with the parameters mentioned in section 5.1 of the VCS PD. All the ex-post parameters have been monitored as per the monitoring plan and presented in section 4.2 of the MR.

The audit team has also checked the distribution records to confirm the location and the implementation of the project.

Monitoring parameters:

Means of verification	Referring to VCS v4.1 and p.360, p.361, p.363 and p.364 of CDM VVS PA, v3.0, the below tables provide a summary on the verification of each monitoring parameters listed in the registered monitoring plan.	
	Monitored parameters required by AMS-II.C	
	Data / Parameter:	$E_{BL, y}$
	Data unit:	kWh
	Description:	Energy (specifically electricity) consumption for the baseline in year y.
	Source of data used:	User Habit Surveys.
	Means of verification/Comments:	Energy consumption for the project activity is calculated by determining the electrical power demand (p_i), a fixed parameter, of the electric stoves upon which operational Wonderbag are used (n_i). This value is multiplied by the average number of hours that are used to cook food, using a Wonderbag. The calculation also considers the grid transmission and distribution losses (l_y). Recording of data is aggregated on an annual basis.
	Cross-check	-

	Data / Parameter:	$E_{PJ,y}$
	Data unit:	kWh
	Description:	Energy (specifically electricity) consumption for the project activity in year y.
	Source of data used:	User Habit Surveys.
	Means of verification/Comments:	Energy consumption for the project activity is calculated by determining the electrical power demand (ρ_i), a fixed parameter, of the electric stoves upon which operational Wonderbags are used (n_i), multiplied by the average number of hours that are used to cook food, using a Wonderbag. The calculation also considers the grid transmission and distribution losses (l_y). Recording of data is aggregated on an annual basis.
	Cross-check	-
	Data / Parameter:	n_i
	Data unit:	Wonderbags
	Description:	Number of pieces of equipment of the group i baseline equipment retrofitted or that would have been retrofitted.
	Source of data used:	Monitored in a database.
	Means of verification/Comments:	Each Wonderbag that is distributed into the field is recorded in a database. The database records include the serial numbers of the bags, the distributing entity (for example, particular

		NGOs), contact details of the people that receive the bags and the dates that the bags are distributed to users.	
	Cross-check	-	
	Data / Parameter:	O_i	
	Data unit:	Hours	
	Description:	Operating hours (i.e., cooking time using a Wonderbag) of group of i project devices (i.e., electrical stoves) in the time interval t in year y	
	Source of data used:	User Habit Surveys	
	Means of verification/Comments:	The cooking time, using a Wonderbag, was established using survey samples. The surveys were carried out in accordance with the CDM's sampling standard and guidance. Recording of data is aggregated on an annual basis.	
	Cross-check	-	
	Data / Parameter:	I_y	
	Data unit:	%	
	Description:	Average annual grid loss of the national South African grid including transmission and distribution.	
	Source of data used:	Eskom Annual Reports.	

	Means of verification/Comments:	The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value is determined from recent data published by the national utility, Eskom. The time period covered by the report Eskom Integrated report spans March 2020 – March 2021. Hence the same value, 0.1180, is used for the 2021 and 2022 years in the calculation of emission reductions.
	Cross-check	-
	Data / Parameter:	U_w
	Data unit:	%
	Description:	Share of users cooking with a Wonderbag in year y.
	Source of data used:	User Habit Surveys.
	Means of verification/Comments:	The share of users cooking with a Wonderbag was established through sampling. The surveys were carried out in accordance with the CDM's sampling standard and guidance. Recording of data is aggregated on an annual basis.
	Cross-check	-
	Data / Parameter:	$\mu_{FOSSIL,i,w}$
	Data unit:	%

	Description:	Share of users cooking with fossil fuel i in year y
	Source of data used:	User Habit Surveys
	Means of verification/Comments:	The share of users cooking with each fossil fuel was established using survey samples. The surveys were carried out in accordance with the CDM's sampling standard and guidance. Recording of data is aggregated on an annual basis.
	Cross-check	-
	Data / Parameter:	$f_{rate,w}$
	Data unit:	%
	Description:	Failure rate of Wonderbags.
	Source of data used:	User Habit Surveys
	Means of verification/Comments:	The failure rate is determined through the User Habit Survey, where respondents are asked whether "the "Wonderbag is still used for cooking?". All the survey respondents indicated "yes" to this question. Therefore the failure rate was determined to be 0. VVB has cross verified the value by interviewing the sample size of the household selected. All users in the selected samples responded that they are still using the Wonderbag. Hence, failure rate considered "0" by the PP is found appropriate.
	Cross-check	-

Data / Parameter:	t_w
Data unit:	%
Description:	Active time in the monitoring period for the full population of Wonderbags type w.
Source of data used:	User Habit Surveys
Means of verification/Comments:	The active time was established using survey samples. The surveys were carried out in accordance with the CDM's sampling standard and guidance.
Cross-check	-

Monitored parameters required by AMS-II.G.

Data / Parameter:	$N_{y,i,j}$
Data unit:	Wonderbags
Description:	Number of project devices of type i (specifically biomass stoves) and batch j operating during year y.
Source of data used:	Monitored in a database.
Means of verification/Comments:	The results of User Habit Survey indicate a 100% operational rate and hence no discount was applied. Data sets are recorded on an ongoing basis and aggregated on an annual basis.
Cross-check	-

	Data / Parameter:	$B_{\text{new,KPT},i,j}$
	Data unit:	Tonnes
	Description:	Annual quantity of woody biomass used in tonnes per project device of type i
	Source of data used:	User Habit Surveys
	Means of verification/Comments:	The KPT was carried out in accordance with the KPT Protocol guidelines listed by the Clean Cooking Alliance. The value for Bnew will not be affected by seasonal changes. Therefore, the surveys do not need to be conducted on days that take seasonal changes into account.
	Cross-check	-
Compliance with the calibration frequency requirements for measuring instruments Due to the nature of the project, none of the monitoring equipment utilized for survey purposes requires calibration. This is because the pieces of monitoring equipment used, which includes hand-held scales, foot scales and measuring jugs, are typically used in residential or household applications and therefore do not have accuracy ranges or calibration requirements associated with meters or equipment utilized in industrial applications.		
Conclusion	The monitoring has been carried out in accordance with the monitoring plan contained in the registered PD. All parameters were monitored and determined as per the registered monitoring plan. Referring to p.360, p.361, p.363 and p.364 of CDM VVS PA, v3.0, VVB confirms through video call and telephonic interviews and from the document review, the actual monitoring system complies with the registered monitoring plan. The substantiation of this conformity on information flow for these parameters including the values in the monitoring reports is reported in the above section. During the verification, all relevant monitoring parameters of the registered monitoring plan have been verified with regard to the appropriateness of the verification method, the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. After appropriate corrections, carried out by the project participant, it is confirmed that all monitoring parameters have	

	been measured / determined without material misstatements and are in line with all applicable standards and relevant requirements. All parameters required to be monitored are recorded at the intervals required by the registered monitoring plan and the applied methodology. On the basis of review of source and nature of available evidences and records, the verification team confirms the quality of evidence for emission reduction provided is sufficient as per CDM VVS PA, v3.0.
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Calibration Details:-

Due to the nature of the project, none of the monitoring equipment utilized for survey purposes requires calibration. This is because the pieces of monitoring equipment used, which includes hand-held scales, foot scales and measuring jugs, are typically used in residential or household applications and therefore do not have accuracy ranges or calibration requirements associated with meters or equipment utilized in industrial applications.

The assessment team has verified the final VCS MR and confirmed that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mentioned in the MR. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. The monitoring plan described the positioning of the equipment.

The information relating to the project implementation, provided in the Monitoring Report is consistent and correct. Total emission reductions achieved under this monitoring period 01/04/2021 to 30/04/2022 (including both days) are 106,112 tCO₂e for AMS-II.C. Emissions Reductions for RfC PA 1 – RfC PA 15 and 73,964 tCO₂e for AMS-II.G. Emissions Reductions for RfC PA 1 – RfC PA 15.

Emissions trading programs and other binding limits

Assessment team confirms that the Net GHG emission reductions or removals generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. Audit team checked the REC Mechanism database of India and found that the project activity is not accredited / registered under REC mechanism. Further, Declaration in effect of the same has been submitted by project proponent to audit team and found to be correct.

The project has not been registered under any other GHG programs. Also, the Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also, assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

The project has not been registered under any other GHG programs. Also, the Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also, assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

The project has not been registered under any other GHG programs. Also, the Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also, assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. <https://www.recregistryindia.nic.in/>
2. <http://cdm.unfccc.int/>
3. <http://www.goldstandard.org/>
4. www.v-c-s.org

The Project has no intent to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

Thus, it is concluded that the project activity not involved on other Emissions trading programs and other binding limits.

Leakage Management for AFOLU projects

Not applicable to the project activity.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description. The details are presented transparently to the assessment team for analysis which leads to positive conclusion for this verification.

Sustainable Development

Apart from fuel and emissions savings, the use of Wonderbag has many other benefits for the household, the community and the world at large. It contributes to sustainable development in South Africa through:

- Increased time (minutes) savings for the person cooking, per Wonderbag
- Reduced monetary (ZAR) spending on cooking fuels Reducing time spent on unpaid domestic and care work, by sex, age and location
- Full-time employment of staff by Wonderbag
- Recycling of materials used to manufacture the bags
- Progress towards sustainable forest management through avoided biomass combustion

The Recipe for Change Grouped Project is in the process of SD VISTa validation and verification. Hence, demonstration of contribution to the United Nations Sustainable Development Goals is reflected in that process and documentation.

Conclusion:

In view of the assessment of MR and supporting documents as listed in Appendix 1 of this report, the validation team is able to confirm that the description contained in the MR of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. Consequently, assessment team confirms that the project description of the project contained in the MR to be complete and accurate. The MR complies with the relevant forms and guidance for completing the VCS MR.

4.2 Safeguards

4.2.1 No Net Harm

As identified by the PP, the project has no negative impact as confirmed in section 2.1 of the MR. Every additional project activity instance to be added to this Grouped Project will summarize any potential negative environmental and socio-economic impacts and the steps taken to mitigate them.

The verification team confirms that the project does not pose any potential negative environmental nor socio-economic impacts. A meeting was conducted for the project and there was no negative feedback from the local stakeholder. Moreover, Wonderbags has positive social-economic impacts which includes improved levels of indoor air pollution that are linked to respiratory illness; increased disposable income from reduced cooking fuel costs and reduced time spent preparing meals, typically the responsibility of girls and women. Such household members may defer their monetary and time saving to other activities, such as education or livelihoods. These are particularly important development impacts for lower income and historically disadvantaged communities in South Africa. Hence, the manufacture and used of Wonderbags results in no net harm to the environment or the communities in which they are used.

4.2.2 Local Stakeholder Consultation

The local stakeholder consultation meetings were held on different days during the validation and have been provided in the section of 2.2 the MR and the project were carried out at the grouped project level which was validated by the validation team at the time of validation of the VCS PD.

PP has an in place on going communication mechanism where each Wonderbag includes a recipe booklet which contains contact information whereby stakeholders are invited to contact Wonderbag via provided contact details.

Stakeholders engagements are also channeled through Wonderbag's distribution network, largely comprising NGOs and other social development institutions, which typically have ongoing access to, or representatives in, the communities in which Wonderbags are distributed.

Wonderbag also engages with stakeholders through electronic and social medial. Wonderbag has recently launched a customer engagement app called MyWonderbag, available at

https://play.google.com/store/apps/details?id=za.racvert.team_wonderbag. In addition, Stakeholders can raise their concern through Facebook page of the Wonderbag. VVB has cross verified the app and the facebook page (<https://www.facebook.com/TheWonderbag/>) of the Wonderbag and no negative comments have been found in the current monitoring period.

4.3 AFOLU-Specific Safeguards

Not applicable as this is a non-AFOLU grouped projects

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The equations and choices provided in the two methodologies and all other methodological tools are correctly quoted in the MR. The emission reductions of the project instances of the grouped project and project activity instance are calculated using the formulae mentioned in the applied methodologies; AMS-II.C (version 15)/B02-a/ AMS-II.G (version 11.1). The verification team has reviewed the emission reduction spread sheets (ER sheets) and checked all the formulae and found they are correct and are in accordance with the monitoring plan of the PD and the applied monitoring methodology. According to applied methodology AMS-II.C (version 15) the baseline, project and leakage emissions are calculated as below: Baseline Emissions The baseline emissions from electricity-based cooking systems are calculated as follows in accordance $BE = E \times EF + Q \times GWP_{y\ BL,y\ CO2,ELEC,y\ ref,BL\ ref,BL}$ <i>This equation is modified as follows to distinguish between the use of electricity or fossil fuels in the baseline.</i> $BE = E \times EF + Q \times GWP_{ELEC,y\ BL,y\ CO2,ELEC,y\ ref,BL\ ref,BL}$
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	Where: $BE_{ELEC,y}$ <i>Baseline emissions from electricity consumption in year y (tCO₂e/y)</i> $E_{BL,y}$ <i>Energy consumption for the baseline in year y (kWh)</i> $EF_{CO_2,ELEC,y}$ <i>Electricity emission factor. If electricity displaced is grid, the emission factor shall be calculated in accordance with the provisions in ASB0040 version 4.1. If electricity displaced is captive electricity, the emission factor in year y shall be calculated in accordance with the "Tool to calculate baseline, project and host emission from electricity consumption"</i> <i>E_{BL} is calculated as follows:</i> Where: $E_{BL,y} = \sum (n_i \times \rho_i \times o_{i,BL} / (1 - l_y)) \quad i$ Where: n_i <i>Number of pieces of equipment of the group i baseline equipment retrofitted or that would have been retrofitted</i> ρ_i <i>Electrical power demand (kW) of the group i baseline equipment.</i> In the case of a retrofit activity, electrical power demand is the weighted average of the rated power (kW) of group i baseline equipment. The baseline equipment for this grouped project consists of different electrical stoves. The power ratings of these electrical stoves can be fixed ex ante. $O_{i,BL}$ <i>Average annual operating hours of the group of i baseline equipment.</i> The operating hours of the baseline equipment in year y can be determined using surveys by measurement of usage hours of baseline equipment. For a large population of baseline equipment: (a) Use a representative sample (sampling determined by a minimum 95% confidence interval and 10% maximum error margin); and (c) Ensure that sampling is statistically robust and relevant, i.e., the selection of the equipment to be analysed for operating hours has a random distribution and is representative of target population (size, location). l_y <i>Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. The reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non-technical grid loss) shall be established and documented by the project participant. A default value of 0.1 shall</i>
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be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

The number of Wonderbags in use (n_i) can be calculated as follows:

$$n_i = N_w \times (u_w - f_{rate,w}) \times u_{ELEC,w} \times t_w$$

Where:

N_w The number of Wonderbags of type w distributed

u_w Share of users actually cooking with a Wonderbag of type w (%)

$u_{ELEC,w}$ Share of users cooking on an electric stove with a Wonderbag of type w (%)

$f_{rate,w}$ Failure rate of the Wonderbags (%)

t_w Active time in the monitoring period for the full population of Wonderbags type w (%)

The baseline energy consumption can be calculated as follows:

$$E_{BL,FOSSIL,i,y} = FC_i \times NCV_{FOSSIL FUEL i}$$

Where

FC_i Baseline consumption of fossil fuel i (unit of consumption/year)

$NCV_{FOSSIL FUEL i}$ Net calorific value of fossil fuel i (TJ/unit of consumption)

F-rate,w – Failure rate of Wonderbags –

PP has taken 0 value for this parameter. PP has provided User Habit Survey Result Sheet from which value has taken 0 since 100% of surveyed wonderbags are in use. VVB has cross verified the value by interviewing the sample size of the household selected. All users in the selected samples responded that they are still using the Wonderbag. Hence, failure rate considered “0” by the PP is found appropriate.

Calculation for baseline Emission reductions for project activity instances as below;

$$BE_y = BE_{ELEC,y} + BE_{FOSSIL,y}$$

Following values has been calculated for the instances:

AMS-II.C.	Unit	RfC1 results	RfC2 results	RfC3 results
BE _y	tCO ₂ e	10,660	10,195	10,663

<u>AMS-II.C.</u>	Unit	RfC4 results	RfC5 results	RfC6 results
BE _y	tCO ₂ e	11,362	18,470	10,276

<u>AMS-II.C.</u>	Unit	RfC7 results	RfC8 results	RfC9 results
BE _y	tCO ₂ e	22,315	22,768	22,570

<u>AMS-II.C.</u>	Unit	RfC10 results	RfC11 results	RfC12 results
BE _y	tCO ₂ e	13,209	8,971	7,459

<u>AMS-II.C.</u>	Unit	RfC13 results	RfC14 results	RfC15 results
BE _y	tCO ₂ e	3,574	917	590

The total fossil fuel baseline emissions in the monitoring period, related to methodology AMS-II.C, were 173,999 tCO₂e.

AMS.II.G. methodology does not separate the calculation between baseline and project emissions and hence only the calculation results for the emission reductions are provided in the following table.

<u>AMS-II.G.</u>	Unit	RfC1 results	RfC2 results	RfC3 results
ER _{y,i,j}	tCO ₂ e	9,309	9,729	9,309

<u>AMS-II.G.</u>	Unit	RfC4 results	RfC5 results	RfC6 results
ER _{y,i,j}	tCO ₂ e	8,944	2,848	9,748

<u>AMS-II.G.</u>	Unit	RfC7 results	RfC8 results	RfC9 results
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		ER _{y,i,j}	tCO ₂ e	164	164	183
		<u>AMS-II.G.</u>	Unit	RfC10 results	RfC11 results	RfC12 results
		ER _{y,i,j}	tCO ₂ e	931	37	73
		<u>AMS-II.G.</u>	Unit	RfC13 results	RfC14 results	RfC15 results
		ER _{y,i,j}	tCO ₂ e	18	18	18

Project Emission

The project emissions from fossil fuel consumption in cooking systems can be calculated as follows in accordance with AMS-II.C.:

$$PE_y = E_{PJ,y} \times EF_{CO_2,y} + PE_{ref,y}$$

Where:

PE_y Project emissions in year y (tCO₂e)

$E_{PJ,y}$ Energy consumption for the project activity in year y (kWh)

$EF_{CO2,y}$ Electricity emission factor. If electricity displaced is grid, the emission factor in year y shall be calculated in accordance with the provisions in ASB0040 version 01.0. If electricity displaced is captive electricity, the emission factor in year y shall be calculated in accordance with the "Tool to calculate baseline, project and/or leakage emission from electricity consumption"

$PE_{ref,y}$ Project emissions from physical leakage of physical refrigerant from the project equipment in year y (tCO₂e/y)

The equation above is modified for fossil fuel consumption as follows:

$$PE_{FOSSIL,y} = E_{PJ,FOSSIL,i,y} \times EF_{CO2,i,y} \times n_i$$

(Equation 7, AMS-IL.C., modified for fossil fuel consumption)

Where:

$E_{PJ,FOSSIL,i,y}$ Project activity energy consumption of fossil fuel i in year y (TJ)

$EF_{CO2,i,y}$ Emission factor for fossil fuel i in year y (tCO₂/TJ)

n_i Number of pieces of equipment of the group i baseline equipment retrofitted or that would have been retrofitted

The number of Wonderbags in use (n_i) can be calculated as follows:

$$n = N \times u \times (1 - f) \times t_{w \text{ w } FOSSIL,i,w \text{ rate,w w}}$$

Where:

N_w The number of Wonderbags of type w distributed

U_w Share of users actually cooking with a Wonderbag of type w (%)

$U_{FOSSIL,i,w}$ Share of users cooking using fossil fuel i with a Wonderbag of type w(%)

$f_{rate,w}$ Failure rate of the Wonderbags (%)

t_w Active time in the monitoring period for the full population of Wonderbags type w (%)

The project activity energy consumption can be calculated as follows:

$$E = FC \times NCV_{PJ,FOSSIL,i,y} \times PJ,i \text{ FOSSIL FUEL } i$$

Where:

$FC_{PJ,i}$ Project activity consumption of fossil fuel i (unit of consumption/year)

$NCV_{FOSSIL \text{ FUEL } i}$ Net calorific value of fossil fuel i (TJ/unit of consumption)

According to applied methodology AMS-II.G (version 11.1) /B02-b/ the baseline, project and leakage emissions are calculated as:

The biomass emission reductions were calculated as follows:

$$ER_{y,i,j} = B_{y,savings,i,j} \times 0.95 \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Where:

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

$B_{y,savings,i,j}$ Quantity of woody biomass that is saved in tonnes per cookstove device type i and batch j during year y

$N_{y,i,j}$ Number of project devices of type i and batch j operating during year y

μ_y Adjustment to account for any continued use of pre-project devices during the year y when applying equations 7 and 8 (fraction). Use 1.0 in other cases.

$f_{NRB,y}$ Fraction of woody biomass that can be established as non-renewable biomass

$NCV_{biomass}$ Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is 'air-dried'.

$EF_{projected_fossil_fuel}$ Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers.

The quantity of woody biomass that is saved due to the project activity is calculated as follows in accordance with option 2 of the AMS-II.G. methodology:

$$B_{y,savings,i,j} = B_{old,i,j} - B_{new,KPT,i,j}$$

Where:

$B_{old,i,j}$ 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

$B_{new,KPT,i,j}$ Annual quantity of woody biomass used in tonnes per project device of type i and batch j , measured as per the Kitchen Performance Test (KPT) protocol. The KPT shall be carried out in accordance with national standards (if available) or international standards or guidelines. (e.g. the KPT Protocol listed by Clean Cooking Alliance)

AMS-II.C.	Unit	RfC1 results	RfC2 results	RfC3 results
PE _y	tCO ₂ e	4,104	4,015	4,096

AMS-II.C.	Unit	RfC4 results	RfC5 results	RfC6 results
PE _y	tCO ₂ e	4,522	7,170	4,030

		AMS-II.C.	Unit	RfC7 results	RfC8 results	RfC9 results
		PE _y	tCO ₂ e	9,061	9,400	9,210
		AMS-II.C.	Unit	RfC10 results	RfC11 results	RfC12 results
		PE _y	tCO ₂ e	4,802	3,084	2,587
		AMS-II.C.	Unit	RfC13 results	RfC14 results	RfC15 results
		PE _y	tCO ₂ e	1,277	326	202
	The total fossil fuel project emissions in the monitoring period, related to methodology AMS-II.C, were 67,887 tCO₂e.					
	Leakage Emissions:					
	No leakage emissions have been identified for the project activity as the introduction of the Wonderbag does not replace the baseline stoves. So the leakage emissions considered 0 tCO₂e.					
	Summary of net GHG emission reductions or removals: Emission reductions are calculated as follows: ER_y = BE_y – PE_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 CO₂e/yr)					
	Conclusion	Calculations applied formulae and method for calculation of baseline emission are in accordance with the registered monitoring plan and are 173,999 in line with the requirements of the applied methodology AMS-II.C. Emissions Reductions for RfC PA 1 – RfC PA 15.				

Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the project activity. The verification team has checked whether calculations of baseline GHG
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	emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Conclusion	Leakage emissions are zero according to the applied methodology and registered CDM PDD

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	When verifying the report emission reduction, VVB ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown above. When assessing the audit trails, VVB also examined: 1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period 2. the source and nature of the evidence 3. if comparable information was available from sources other than that used in the monitoring report, VVB cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. VVB also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology. Proper data management inclusive of data acquisition and aggregation, data management system is being followed for the project activity. The monitoring personnel at site are well trained and follow reproducible routines. Thus, they are competent to carry out the relevant tasks with sufficient accuracy.
Conclusion	The formulae and the methods referred in the MR and the emission reduction calculation spread sheet comply with the methods described in the registered PDD. No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the GHG emission calculation is found correct. TUV SUD confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report. Calculations applied formulae and method for calculation of GHG emission are in

	accordance with the registered monitoring plan and are in line with the requirements of VCS, the applied methodology and p. 372, p.373 of CDM VVS PA ver 3.0.
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4.6 Non-Permanence Risk Analysis

The project activity was operational during the complete monitoring period. Hence there is no further requirement for the non-performance analysis rating during the monitoring period of the project activity.

5 VERIFICATION CONCLUSION

TUV SUD was contracted by Wonderbag UK Limited, has performed the independent verification of the emission reductions for the VCS project activity (VCS ID- 2384) “Recipe for Change Grouped Project” in South Africa for the monitoring period 1 April 2021 to 30 April 2022 as reported version 4 dated 23/11/2022. The Wonderbag UK Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emission reductions from the project activity.

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. TUV SUD commenced the verification based on the baseline, monitoring methodology AMS-II.C version 15 and AMS-II.G version 11 and, the monitoring plan mentioned in the registered VCS PD.

TUV SUD verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. TUV SUD planned and performed the verification by obtaining evidence and other information and explanations that TUV SUD considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emission reductions reported for the project activity for the period 1 April 2021 to 30 April 2022 are fairly stated in the Monitoring report version 4 dated 23/11/2022. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-II.C version 15 and AMS-II.G version 11 and the VCS standard, version 4.3.

Verification period: From 01/04/2021 to 30/04/2022.

Verified GHG emission reductions and removals in the above verification period:

AMS-II.C. Emissions Reductions

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2021	107,411	42,420	-	64,991
2022	66,588	25,467	-	41,120
Total	173,999	67,887	-	106,112

AMS-II.G. Emissions Reductions

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2021	51,494	-	-	51,494
2022	22,470	-	-	22,470
Total	73,964	-	-	73,964

Grouped project emission reductions:

Actual emission reduction for this monitoring period is less than the estimated ERs, which is conservative and accepted by the DOE.

Year	Total Emission Reductions (tCO ₂ e)	Ex-ante estimated ERs (tCO ₂ e)
2021	116,485	206,704
2022	63,590	
Total	180,076	

APPENDIX 1: <DOCUMENTS REVIEWED>

No	Author	Title	References to the document
1	UNFCCC	CDM VVS for PA v3.0	
2	UNFCCC	Applied baseline and monitoring methodologies a. AMS-II.C. version 15, "Demand-side energy efficiency activities for specific technologies" b. AMS-II.G. version 11.1, "Energy efficiency measures in thermal applications of non-renewable biomass"	-
3	Verra	VCS Standard v4.3	-
4	Promethium Carbon	VCS MR – Version 5.0	11/01/2023
5	Promethium Carbon	ER Calculation sheet Version 5.0	11/01/2023
6	Wonderbag UK	Declaration(s) from Project proponent on the following: a) Project not registered or under process of registration in any other Emissions Trading Programs and Other Binding Limits. b) Project not registered or under process of getting and Other Forms of Environmental Credit c) The project has not been registered and is not seeking registration under any other GHG program d) Projects not Rejected by Other GHG Programs Declaration from PP confirming that the project is not claiming any other environmental credits other than VCU's	-
7	Wonderbag UK	Evidence for project ownership:	-
8	Wonderbag UK	Evidence for Right of use	
9	Wonderbag UK	Company registration certificate for the PP	
10	Wonderbag UK	User Habit survey	-

11	Wonderbag UK	Monitoring Manual	-
12	Wonderbag UK	Database for the Wonderbags distributed for the monitoring period	
13	Wonderbag UK	Evidence for unique identification of each of the Wonderbags	
14	Wonderbag UK	Wonderbag distribution agreement and questionnaire	
15	Wonderbag UK	Sample warranty card format for the Wonderbag	
16	Wonderbag UK	Evidence for the Grouped project management including Wonderbag production (contract), distribution	
17	Wonderbag UK	Training records	
18	Wonderbag UK	Contract with the Wonderbag manufacturers	
19	Wonderbag UK	Evidence for the random sample selection for the parameters opted for monitoring survey	
20	Wonderbag UK	Evidence of distribution records/ Carbon Credit waivers	
21	Wonderbag UK	VCS PD for the grouped project "Recipe for Change Grouped Project" version 3.0, dated 06/05/2021 and its corresponding validation report version 3.0, dated 06/05/2021	
22	UNFCCC	• "Standard for sampling and surveys for CDM project activities and programme of activities" (version 08.0) • Guidelines for sampling and surveys for CDM project activities and Programme of Activities (version 04) Kitchen Performance Test (KPT) guidelines, version 04	
23	UNFCCC	Standardized Baseline (ASB0040): Grid emission factor for South African Power Pool version 1	

APPENDIX 2: FINDINGS IN THIS VERIFICATION

Table 1. Remaining FAR from validation and/or previous verifications

NA.

Table 2. CL from this verification

CL ID	01	Section no.	1.11, 2.2, 3.1, 3.3,3.2.2, 4.2, 4.3	Date: 12/08/2022
Description of CL				
Supportive documents need to be provided which are listed below:				
- Evidence for use of recycled material for manufacturing of Wonderbag (s) - Proof of lifetime assessment of Wonderbag (s) - List of Households for which survey records are not available - Evidence for distribution of Wonderbags to low-income communities - List of Wonderbags distribution partners - Copy of Agreements with the Wonderbags distribution partners - Records on Replaced Wonderbags - Records of Internal Quality Check of Wonderbags - Supportive document to verify technical specifications of gas stove type is missing				
Project participant response				Date: 24/08/2022
The supporting documents have been provided and are list below. The supporting documents for items 1, 2, 3, 6, 8, 9 were provided on 5 August 2022. The supporting documents for items 4 and 5 are provided with this response. With regards to item 4, the supporting document is a current template of the distribution partnership agreement between Wonderbag and distribution parties, which are typically non-profit organisations. Each distribution partner is requested to indicate the LSM (Living Standards Measurement) to ensure that Wonderbags are distributed to low-income communities.				
Documentation provided by project participant				
- Foam invoices - Minmac_Wonderbag 10 year Test Report_2021-03-31 2022-08-02 Email Audit query - Flood victim households - UH Survey 2022 - Wonderbag Partnership Agreement template, page 3 - Distribution partners - Wonderbag Distribution Agreement - Community Chest_2020-06-01 - n/a - QUALITY CONTROL PROCESS - Defy Gas Stove 129 specifications				
DOE assessment				Date: 20/09/2022

All requested documents are received. CL is closed

CL ID	02	Section no.	2.1	Date: 12/08/2022
Description of CL				
In the paragraph 04 of following section PP has stated that use of Wonderbags has positive social-economic impacts. DOE has requested the description of results based upon which the conclusion is made for the particular project activity instances.				
Project participant response				Date: 24/08/2022
The section has been revised to align with section 1.11 and the draft SD Vista project description.				
Documentation provided by project participant				
Revised MR				
DOE assessment				Date: 20/09/2022
Revised MR received. CL is closed				

CL ID	03	Section no.	2.2	Date: 12/08/2022
Description of CL				
In paragraph 14 of following section PP has stated that lifetime of Wonderbag is assumed to be 15 years. DOE has requested to provide the results of laboratory analysis based upon which the lifetime of Wonderbag is being estimated.				
Project participant response				Date: 24/08/2022
The requested supporting document was provided on 5 August 2022.				
Documentation provided by project participant				
Minmac_Wonderbag 10 year Test Report_2021-03-31				
DOE assessment				Date: 20/09/2022
Lab report has been received. CL is closed				

CL ID	04	Section no.	3.1	Date: 12/08/2022
Description of CL				
In paragraph 03 of following section PP has described the reasoning for missing survey records of certain household for respective project activity instance. DOE has requested to provide counts and details of these households.				
Project participant response				Date: 24/08/2022
Please see the supporting document titled '2022-08-02 Email Audit query – Flood victim households – UH Survey 2022' provided on 5 August 2022				
Documentation provided by project participant				
'2022-08-02 Email Audit query – Flood victim households – UH Survey 2022'				
DOE assessment				Date: 20/09/2022
Supporting document has been received. CL is closed				

CL ID	05	Section no.	4.1	Date: 12/08/2022
Description of CL				

1. In the following section default value for listed parameter EF_(CO2,i,y) is taken from reference document “2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: energy, stationary combustion” for Fuel category: Sub-Bituminous Coal from Table 2.2 but Sub-Bituminous Coal is not listed in Table 2.9 “RESIDENTIAL SOURCE EMISSION FACTORS”. DOE has requested PP to provide the justification for choice of fuel category for the respective parameter. 2. In the following section country specific values for listed parameter NCV_(FOSSIL FUEL i) are taken from reference document “South African Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry” for respective fuels However, EF_(CO2,i,y) is NCV based and taken from reference document “2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: energy, stationary combustion” so, DOE has requested PP to justify their approach for reporting the default emission factor values for which NCV values for respective fuels are not same as reported in the joint PDD-MR. 3. In the following section for listed parameter MAlother ,l, description of category “other” is missing. 4. In the following section for listed parameter B_(old,i,j) data unit is not in accordance with the table 5 under paragraph 42 of section 5.5: “Data and parameters not monitored” of respective methodology AMS-II.G., Version 11.1. 5. In the following section for listed parameter E_(PJ,y) equation for calculation is not in accordance with the Equation (8), paragraph 35 of section 5.5. “Project activity emissions” of respective methodology AMS-II.C_(v15.0), Version 15.0. 6. In the following section for listed parameter ni ER data unit in the Emission Reduction Calculation data sheet is not appropriate. 7. In the following section for listed parameter l_y reference of respective section in the data source is missing. 8. In the following section for listed parameter [FC] _i representation of code and description is inappropriate even though, appropriate code is used in equation to calculate E_(PJ,FOSSIL,i,y).	
Project participant response	Date: 24/08/2022
1. Coal being used for residential use primarily depends on what is available. Coal is predominantly used in Mpumalanga where a large portion of the coal power plants are. Sub bituminous coal is generally used in these plants. The households in the area would likely use any discarded coal of this type. This value has been fixed ex ante at project validation. 2. The emission factors for the respective fuels are the same factors that are listed in the “South African Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry”. The figures can be seen in Annexure A of the supporting document. Therefore a country specific value is relevant as it is in an official published document. The NCV’s are from Appendix D of the same supporting document and are specific to the fuels listed. The values are the same as those in the Project Description. These values have all been fixed ex-ante at project validation. 3. The other refers to any other woody biomes not included under forests. This was assumed as zero as the remaining land in SA is semi-arid. The parameter table has been revised to reflect the description as per the tool 4. The unit and value is aligned to the registered PD that was validated at project registration. The inclusion of the adult equivalent allows us to normalise results to account for differing household sizes. This value was fixed ex ante 5. The equation has been revised in accordance with Equation 8 of the methodology. 6. The units in the spreadsheet have been revised accordingly to reflect the correct unit. 7. The data source row of the parameter table is aligned with the registered PD. The value for ly is taken directly from the Eskom Annual Report in the technical statistics table. 8. The appropriate subscript, PJ, has been added to correct the parameter.	
Documentation provided by project participant	
Technical Guidelines April 2017, provided on 5 August 2022	

DOE assessment	Date: 20/09/2022
Revised MR and ER sheet along with supporting documents have been received. CL is closed	

CL ID	06	Section no.	5.1	Date: 12/08/2022
Description of CL				
In the following section listed parameter $U_{ELEC,w}$ is described as “Share of users cooking on an electric stove with a Wonderbag of type w (%)” for the calculation of numbers of equipment in baseline DOE has requested PP to justify why the respective description for includes Wonderbag for $U_{ELEC,w}$ even though, baseline boundary is defined by excluding the use of Wonderbag in section 3.3 Project Boundary of PD, Version 3.0.				
Project participant response				Date: 24/08/2022
This was a typo and has been revised so that the correct wording is used. Only reference to electric stoves should be included.				
Documentation provided by project participant				
Revised MR				
DOE assessment				Date: 20/09/2022
Revised MR has been received. CL is closed				

Table 3. CAR from this verification

CAR ID	01	Section no.	3.2.2	Date: 12/08/2022
Description of CAR				
In paragraph 04 of following section PP has stated the current monitoring approach “more accurate” However, results are validated against the precision criteria given in paragraph 18(b)(i)(a) of the CDM Survey Sampling Standard, version 8.				
Project participant response				Date: 24/08/2022
The text has been revised from “more accurate” to “more precise” as this is more reflective of the validation against the prevision criteria.				
Documentation provided by project participant				
Revised MR				
DOE assessment				Date: 20/09/2022

Revised MR has been received. CAR is closed

Table - 4 FAR from this verification:

FAR ID	01	Section no.		Date: 12/01/2023
Description of FAR				
VVB conducting next verification should conduct a separate sampling plan to assess whether the Wonderbags that have past their warranty periods have the same insulation properties as new Wonderbags and whether a discount factor is needed.				
Project participant response				Date:
Documentation provided by project participant				
DOE assessment				Date: