



GROUPED PROJECTS FOR CAMBODIA WATER PURIFIER

(SIPCO)

Project title	Grouped projects for Cambodia Water Purifier
Project ID	3052
Monitoring period	02-May-2022 to 31-December-2023
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Most recent date of issue	11-September-2024
Version	01.4
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Prepared by	Sustainability Investment Promotion and Development Joint Stock Company (SIPCO)

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The proposed project aims at improving the quality of drinking water through dissemination of low green gas emitting safe drinking water purifier (SDWP) to provide clean drinking water for households in Kingdom of Cambodia. For this reason, this proposed project activity will avoid the use of thermal energy and/or low energy and associated emissions.

The grouped project activity will minimize the use of non-renewable biomass utilized for boiling water as a means purification to achieve safe drinking water quality in the absence of this project activity. This directly leads to reduced greenhouse gas emissions. Furthermore, it can be helpful to user's health.

The project activity targets households in communities with no previous water purifiers access. The geographical boundary is in Cambodia. Water purifiers are distributed free of cost to user. Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) financed the implementation of the project in full.

The scenario existing prior to the implementation of the project is the actual baseline scenario which is equal to the existing common practice by the households i.e. in absence of the project activity the equivalent amount of thermal energy generated using firewood to meet the boiling water demand.

The grouped project will distribute water purifiers to households who use woodfuel to boil drinking water. All the project instances to be included in this grouped projects will be from within Cambodia only.

Preventing overlaps with existing projects in the same area:

Project proponent (PP) chose Women for Peace and Development (CWPD) as its distribution partner, an organization with a wide network from central to local levels, the ability to reach every household to investigate the baseline scenario and the ability to access advanced equipment in other carbon programs. CWPD is also the distribution partner for PP in VCS 2925. To determine the initial list of beneficiaries for the project, the village and commune level of Cambodia conducted surveys as per the project criteria and simultaneously compiled lists for both projects 2925 and 3052. One of the primary criteria for selecting beneficiaries is that these households must not receive similar products such as improved stoves and water filters from any another GHG program. The lists of households receiving improved stoves and water purifiers were clearly divided and separated to avoid duplication of beneficiaries. Afterward, the central-level CWPD consolidated the initial list and sent it to PP. PP then randomly selected samples, following the

Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 09.0), which refers to the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 04), to conduct the baseline surveys. The final list of beneficiaries was created based on these results for distribution activities. The devices are distributed to households according to the final list, with each end-user signing an agreement to confirm receipt of the device. This distribution process is overseen by the village/commune-level local authorities to prevent any duplication of households between the two projects.

Currently, there are 10 project activity instances under the grouped project¹. The first water purifier was distributed on 02-May-2023. The first monitoring period is from 02-May-2022 to 31-December-2023. Until the end of this monitoring period, 150,000 water purifiers (WP) were reported installed under grouped projects. The detail of implementation schedule is illustrated as the table below:

No	Month of installation	Number of water purifier
1	May-2022	3,757
2	June-2022	5,000
3	July-2022	5,000
4	August-2022	8,000
5	September-2022	9,916
6	October-2022	12,867
7	November-2022	13,942
8	December-2022	12,506
9	January-2023	2,100
10	February-2023	14,031
11	March-2023	13,988
12	April-2023	14,308
13	May-2023	14,611
14	June-2023	12,974
15	July-2023	7,000
Total	15 months	150,000 WPs

¹ The details of 10 project activity instances are mentioned in the section 3.1.

The total GHG emission reductions generated in the first monitoring period from 02-May-2022 to 31-December-2023 is 245,587 tCO₂.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	Crediting period: 02-May-2022 to 01-May-2032 The approval date: 21-Jun-2024	VCS	Carbon Check (India) Private Limited	N/A
Verification	From 02-May-2022 to 31-Dec-2023	VCS	EcoLance Private Limited	0.84 year

1.3 Sectoral Scope and Project Type

Sectoral scope ²	03 – Energy Demand
Project activity type	Type III - Other projects activities not included in Type I or Type II

1.4 Project Proponent

Organization name	Sustainability Investment Promotion and Development Joint Stock Company
Contact person	Ms. Nguyen Thi Hong Hanh
Title	Director
Address	6 th Floor, Hop Long Building, No.1, 59 Lang Ha Street, Ba Dinh District, Hanoi, Viet Nam
Telephone	+84 243 519 0955
Email	info@carbonvietnam.com

1.5 Other Entities Involved in the Project

Not Applicable.

² Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

1.6 Project Start Date

Project start date	02-May-2022
Justification	As per section 3.8 of the VCS Standard (v4.7), The project start date of a non-AFOLU project is the date on which the project began generating GHG emission reductions or removals. The project activity is a non-AFOLU project and first water purifier under the project has been operating from 02-May-2022. Thus, the project start date is as 02-May-2022.

1.7 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☒ Ten years, fixed ☐ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
Start and end date of first or fixed crediting period	02-May-2022 to 01-May-2032

1.8 Project Location

The grouped project is hosted by Cambodia. The grouped project covers Cambodia bounded between: Latitudes: from 10.41 N to 14.80 N; Longitudes: from 102.29 E to 107.83 E.

The detail of coordination of Cambodia was be provided separately in KML file.

The first project activity instance was distributed in Takeo Province of Cambodia with the following geographic coordinates: latitude 10.9321 N; 104.7987 E



Figure 1: Cambodia Map

Cambodia is divided into 25 provinces. To facilitate the management, implementation, monitoring and sampling stages of the project, the project proponent divides the project boundary into 4 zones.

No.	Zones	Provinces
1	North-Western	Banteay Meanchey, Oddar Meanchey, Preah Vihear, Siem Reap
2	Eastern	Kratie, Mondul Kiri, Ratanakiri, Stung Treng
3	Mekong Lowlands	Kampong Cham, Kampong Chhnang, Kampong Thom, Kandal, Prey Veng, Svay Rieng, Phnom Penh, Takeo and. Tboung Khmum
4	Cardomom and Elephant Mountains	Battambang, Koh Kong, Pursat, Kampong Speu, Kampot, Kep, Pailin and Preah Sihanouk

10 project activity instances during this monitoring were implemented at 9 provinces within Cambodia with the longitude and latitude coordinates the below:

Project activity instance	Province	Coordinate
PAI 001; PAI 009	Takeo	104.7987 E, 10.9321 N https://www.google.com/maps-place-Tak%C3%A9,+Campuchia-@10.9366166,104.4246985,10z-data=!3m1!4b1!4m6!3m5!1s0x31097ea70af3c445:0x73e3a94e2827c36a!8m2!3d10.9321519!4d104.798771!16zL20vMDJoMmRs?hl=vi-VN
PAI 002	Kep	104.3559 E, 10.5360 N https://www.google.com/maps-place-Kep,+Campuchia-@10.49245,104.1812881,11z-data=!3m1!4b1!4m6!3m5!1s0x310836851a8b389f:0x1d6a42c22bd268ae!8m2!3d10.536089!4d104.3559158!16s%2Fm%2F0crfr1v?hl=vi-VN
PAI 003	Svay Rieng	105.7993 E, 11.0878 N https://www.google.com/maps-place-Svay+Rieng,+Campuchia-@11.194139,105.2338395,9z-data=!3m1!4b1!4m6!3m5!1s0x310b07eb6e6a2b43:0xea23edfab65bf0c8!8m2!3d11.142722!4d105.8290298!16zL20vMDJoMmQ1?hl=vi-VN
PAI 004	Prey Veng	105.3280 E, 11.4851 N https://www.google.com/maps-place-Prey+Veng,+Campuchia-@11.3648215,105.456473,10z-data=!3m1!4b1!4m6!3m5!1s0x310b936cb013b065:0x3a05a414cdd1429b!8m2!3d11.3802442!4d105.5005483!16zL20vMDJoMmM5?hl=vi-VN
PAI 005	Tbong Khmum	105.6414 E, 11.9056 N https://www.google.com/maps/place/Tbong+Khmum,+Campuchia/@11.9492729,105.279207,9z/data=!3m1!4b1!4m6!3m5!1s0x310c728a36aeb3ad:0x22401b5bf292b69f!8m2!3d11.8891023!4d105.876004!16s%2Fm%2F0_1n0kq?hl=vi-VN&entry=ttu
PAI 006	Kampong Speu	104.52085 E, 11.45332 N https://www.google.com/maps-place-Kampong+Speu,+Campuchia-@11.5744359,102.9630898,8z-data=!3m1!4b1!4m6!3m5!1s0x310928256ebe44a9:0x468315122092d785!8m2!3d11.6155109!4d104.3791912!16zL20vMDJoMjQ1?hl=vi-VN

PAI 007	Kampong Thom	104.8887 E, 12.7111 N https://www.google.com/maps/place/Kampong+Thom,+Cam+puchia/@12.8158497,103.646034,8z/data=!3m1!4b1!4m6!3m5!1s0x310de21fe3d2c3ab:0x64bcff54ced9347c!8m2!3d12.8221829!4d105.1258955!16zL20vMDJoMjRt?hl=vi-VN&entry=ttu
PAI 008	Kampong Cham	105.4635 E, 11.9933 N https://www.google.com/maps/place/Kampong+Cham,+Ca+mpuchia/@11.9889772,105.3958789,13z/data=!3m1!4b1!4m6!3m5!1s0x310c6a648a9f6931:0x3f4e5cee1b275bb4!8m2!3d11.9924294!4d105.4645408!16zL20vMGJnbW1k?hl=vi-VN&entry=ttu
PAI 010	Kampot	104.1640 E, 10.5942 N https://www.google.com/maps/place/Kampot,+Campuchia/@10.590923,104.085756,12z/data=!3m1!4b1!4m6!3m5!1s0x310836897d5fd26f:0x6f50ed443bd607ff!8m2!3d10.5942421!4d104.1640355!16zL20vMGMzbnRi?hl=vi-VN

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AMS-III.AV	Low greenhouse gas emitting safe drinking water production systems	08.0
Methodology	AMS-I.E	Switch from non-renewable biomass for thermal applications by the user	13.0
Tool	21	Demonstration of additionality of small-scale project activities	13.1
Tool	30	Calculation of the fraction of non-renewable biomass	04.0
Tool	01	Tool for the demonstration and assessment of additionality	07.0
Standard		Standard for Sampling and Surveys for CDM Project. Activities and Programme of Activities	09.0
Guideline		Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities	04.0

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

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

☐ Yes ☒ No

1.10.2 Registration in Other GHG Programs

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

☐ Yes ☒ No

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

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

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

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

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

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

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

☒ Yes ☐ No

If yes:

Is the project proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through the Verified Carbon Standard project, title “Grouped projects for Cambodia” (VCS project ID 3052) for the greenhouse gas emission reductions or removals associated with water purifiers, manufactures by Viet Charcoal Production Company Limited’s in Di Su commune, My Hao district, Hung Yen province, Vietnam and distributed by Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) whose emissions footprint is changed by the project activities”.

☒ Yes ☐ No

See evidence in Appendix 2 in the document.

1.12 Sustainable Development Contributions

The project activity helps in achieving following co-benefits, which contributes in sustainable development in host country.

1. Environmental sustainability:

- The project significantly reduces greenhouse gas emissions over its lifetime.
- The project reduces the use of non-renewable biomass from forests, assisting the maintenance of existing forest stock, protecting natural forest eco-systems and wildlife habitats.
- The protection of standing forests ensures the maintenance of watersheds that regulate water table levels and prevent flash flooding.

2. Social benefits

- Purchasing or collecting firewood to boil the water constitutes a significant expense for the very poorest households and communities. The project provides access to clean drinking water, which reduces the cost for families and thereby improve attendance at households, increase productivity, and more generally give a sense of hope and opportunity.
- Micro-entrepreneurs: low greenhouse gas emitting water purification technologies offer scope for micro-entrepreneurs (Distributors/Installers), thereby creating jobs and supporting families.
- There is a direct incentive to ensure that the projects (instance) have a successful long - term operation as this ensures SDWP continues.
- Polluted indoor air due to open and uncontrolled combustion is a huge health concern. Low greenhouse gas emitting water disinfection technologies tackle this problem by reducing the combustion of wood fuel.
- The project alleviates the work burden of women and children as they have to spend less time to collect firewood for boiling water.

3. Economic benefits

- The project activity develops a section of Cambodia rural economy through the installation and maintenance of SDWPs, as well as work related to monitoring of the carbon registration activity.

The proposed project delivers a long term, secures and simples contribution to sustainable development in Cambodia that would not exist without carbon finance.

Table 1: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	3.9	Project specific indicator: The percentage of beneficiary who report their kitchen reduce air pollution	Implement activities to decrease	Until this monitoring period, PP distributed 150,000 water purifiers to households who do not access clean water and use woodfuel to boil drinking water. The activity leads to reduce dust and smoke, reduce air pollution thereby in improved health conditions of 150,000 households, especially women and children who are the main cooking in households.	PP distributed 150,000 water purifiers to households who do not access clean water and use woodfuel to boil drinking water. The activity leads to reduce dust and smoke, reduce air pollution thereby in improved health conditions of 150,000 households, especially women and children who are the main cooking in households.
2)	4.3	Project specific indicator: Number of people receiving formal and/or non-formal education and training	Implement activities to increase	Until this monitoring period, PP distributed 150,000 water purifiers to households in 09 provinces in Cambodia. 150,000 household representatives attended communication sessions organized by SIPCO in collaboration with CWPDP at commune centre or distribution points. During these communication sessions, SIPCO or CWPDP trained how to use the water purifier, the role of the project's water purifier in sustainable development, and the importance of their water purifier usage habits in addressing climate change.	PP distributed 150,000 water purifiers to households in 09 provinces in Cambodia. 150,000 household representatives attended communication sessions organized by SIPCO in collaboration with CWPDP at commune centre or distribution points. During these communication sessions, SIPCO or CWPDP trained how to use the water purifier, the role of the project's water purifier in sustainable development, and the importance of their water purifier usage habits in addressing climate change.

3)	5.4	Project specific indicator: Number of end users reporting reduction in their time spent on unpaid domestic and care work, by sex, age and location.	Implement activities to decrease	Until this monitoring period, 150,000 water purifiers to 150,000 households in Cambodia. Through a representative sample survey, the results showed that 150,000 households reported saving time spent for collecting fire wood and boiling drinking water.	150,000 water purifiers to 150,000 households in Cambodia. Through a representative sample survey, the results showed that 150,000 households reported saving time spent for collecting fire wood and boiling drinking water.
4)	6.1	Project specific indicator: Increase of population who are used safely managed drinking water service	Implement activities to increase	Until the monitoring period, 10 PAIs give access to safe drinking water by the form of clean water technology in 150,000 households under the project activity.	10 PAIs give access to safe drinking water by the form of clean water technology in 150,000 households under the project activity.
5)	8.3	Project specific indicator: Number of employment created	Implemented activities to increase	10 PAIs created 30 employments right along distribution and post-installation operation & Maintenance of water purifier, spot checks and periodic surveys. and level of mass production	10 PAIs created 30 employments right along distribution and post-installation operation & Maintenance of water purifier, spot checks and periodic surveys. and level of mass production.
6)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implement activities to increase	10 PAIs contributes to GHG emission reductions. The emission reduction for the first monitoring is 245,587 tCO ₂	10 PAIs contributes to GHG emission reductions. The emission reduction for the first monitoring is 245,587 tCO ₂
7)	15.1	Project specific indicator – Amount of non-renewable biomass saved	Implemented activities to increase	During this monitoring period, the grouped project contributes an estimated reduction of deforestation of 1.638 tonnes of biomass per water purifier per year, equivalent 245,700 tone biomass from forest surrounding the communities thereby leading to an increase in above ground biomass in these forests.	The grouped project contributes an estimated reduction of deforestation of 1.638 tonnes of biomass per water purifier per year, equivalent 245,700 tone biomass from forest surrounding the communities thereby leading to an increase in above ground biomass in these forests.

1.13 Commercially Sensitive Information

Not applicable. The grouped projects do not have any commercially sensitive information.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Below stakeholders were identified since validation, there are no changes at verification.

Stakeholder Identification

The process of identifying stakeholders involves categorizing individuals or groups who are expected to have a direct or indirect impact on the project or those who have an interest in it.

SIPCO identifies the relevant stakeholders via 3 steps who are associated throughout the grouped project lifetime. The steps are illustrated like as:

Step 1: The first step is to determine the expected and unexpected outcomes of the grouped project's activities. Then the results are established, the potential stakeholders affected by these impacts are identified.

Step 2: Stakeholder group identification if carried out at each step of project implementation, using a holistic approach to the project's total benefits and co-benefits. The assessment for stakeholder identification at the different stages is as follows:

- Project ideation: Stakeholders could include academic institutions, self-help organizations, and local officials who can assist the project promoter in gaining traction in the community.
- Project development: government authorities, NGOs, community development, investors would be stakeholders at this stage.

	• Project implementation: end-user, distribution partners, water purifier manufactures, would be the stakeholders during implementation stage. Distribution partner of the grouped project is Cambodian Women for Development and Peace (CWPD) which has signed contract with SIPCO for distributing water purifier to households. CWPD have system from central to village, they can know exactly these households who are boiling drinking water by the traditional cookstove and they can select the correct end-users. • Project validation and verification: surveyors, distribution partners, end-users... could be some of the main stakeholders during this stage. Almost of project stakeholders affected by the project activity identified in the step 2. Step 3: Make the stakeholder category and determine direct/indirect effects based on each stakeholders identified in step 2 as the final step of the identification process. The final list of stakeholder includes water purifier end-users, distribution partner (CWPD), government authorities, local NGOs and water purifier manufactures. The full list of stakeholders has been provided to VVB as supporting document.
Legal or customary tenure/access rights	Not applicable. The grouped project only involves distribution water purifier to household and it does not involve territories and resources.
Stakeholder diversity and changes over time	Most of stakeholders are identified at period of project activity, from starting, development, implementation and monitoring. There is insignificant change in stakeholders' diversity and therefore have no real impact on their opinion during this monitoring period. 1. Water purifier end-users: No change was observed in structure & functionality. 2. CWDP: No change in structure and functionality or any organization values.

	3. Government authorities: No change was observed in structure & functionality. 4. Local NGOs: No change was observed in structure & functionality. 5. Manufacturer: More jobs for their employee in manufacturing, transportation and maintenance water purifier
Expected changes in well-being	- Reduce deforestation and forest degradation in Cambodia through involvement of stakeholders in discontinuing the use of firewood for boiling water - Provide safe drinking water that reduces costs for families and thus reduce morbidity and mortality in children and adults related to intestinal diseases such as diarrhea - Reducing the heat generated by boiling water with a wood stove also contributes to improving people's health, especially when boiling water in hot weather - Reduce in indoor air pollutants from wood smoke and avoid smoke related health disorders
Location of stakeholders	Except for the WP manufacture in Viet Nam, the remaining stakeholders are in Cambodia
Location of resources	Cambodia

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	The PP is maintaining ongoing communication with stakeholders through different measures. During the monitoring survey, project has taken the chance to update information to different stakeholders, and collected comments through interviews, surveys, direct observations, group discussions. The PP also conducts and reports the monitoring result from the random sampling of to all stakeholders on annually basis. Staff of SIPCO and CWPDP of the villages communicates & collects end-users' comments through visits to household at least 1 time per year.
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	Through monitoring survey trip, the field team managers also actively organize and conducts group discussions with different stakeholders The data from these interactions is compiled into annual reports and updated to the CWPD & local governmental authority. Through the ongoing communication process, all the implementation information, such as the results of monitoring, the risks, costs and benefits the project and the plan of site visit from verification body has been updated timely to the stakeholders. In addition, the PP also updates workers on relevant law and applicable regulation (if any) and conduct additional educational services as requested by the beneficiary.
Date(s) of stakeholder consultation	28-January-2024, SIPCO sent the report of this monitoring period to CWPD
Communication of monitored results	The monitored results have been shared with Woman Union & relevant stakeholders through annual reports include: 1. The list of households has been selected for survey 2. The summarize of the result of SIPCO's representative sample conduct survey.
Consultation records	All formal consultation will be logged in the consultation forms. Forms will be saved for record of correspondence
Stakeholder input	During this ongoing communication, all households participating in the survey were satisfied with the project's device and their lives have greatly improved since receiving water purifiers. There are no negative comments about the grouped projects and its devices.

2.1.3 Free, Prior, and Informed Consent

Consent	It is entirely up to individual homes in the participating villages to decide whether or not they choose to take part in the adoption of water purifier; this is a purely optional activity.
Outcome of FPIC	Before the installation takes place, free, prior, and informed permission is obtained from all parties involved. The grouped project activity involves distribution of water purifiers to households and it does not involve any land, relocated people, and physical or economic displacement.

2.1.4 Grievance Redress Procedure

Grievances received	Resolution and outcome
In this monitoring period, the grouped project has not received any grievances.	Not Applicable

Project proponent has established a grievance mechanism in the project area which has been explained to the stakeholders during stakeholder meetings and the project implementation progress. The stakeholders affected by the project can express any complaint. Any grievances could send to SIPCO email address. Also stakeholders can voice their grievances to any officers who will then escalate using the correct process. For online form, stakeholders can complete a grievance form located on SIPCO website: www.carbonvietnam.com

The grievance mechanism process could be illustrated as below:



- **Receive Grievance**

The grievance could be received by all means, such as in person/over the phone, via email/website,

- Record

All formal grievances will be logged in the External Grievance Register and Grievance Lodgment Forms will be saved for record of correspondence.

- Screen

The stakeholder contact officer is responsible for assigning a grievance owner to liaise with the external stakeholders and work on a resolution. Grievances will be screened depending the level of severity in order to determine who the grievance owner will be and how the grievance is approached.

- Acknowledge

A grievance will be acknowledged, the grievance owner, within two working days of a grievance being submitted. Communication will be made either verbally or in written form.

The acknowledgement of a grievance should include a summary of the grievance, method that will be taken to resolve the grievance and an estimated timeframe in which the grievance will be resolved. If required, the acknowledgement provides an opportunity to ask for any additional information or to clarify any issues.

- Investigate

The grievance owner is responsible for investigating the grievance. The investigation may require the grievance owner to make site visits, consult employees, contact external stakeholders and complete other activities. Records of meetings, discussions and activities all need to be recorded during the investigation. Information gathered during the investigation will be analysed and will assist in determining how the grievance is handled and what steps need to be taken in order to resolve the grievance.

- Act

Following the investigation, the grievance owner will use the findings to create an action plan outlining steps to be taken in order to resolve the grievance. The grievance owner is responsible for assigning actions, monitoring actions undertaken and making sure deadlines are adhered to. Once all actions have been completed and the grievance owner feels the grievance has been resolved, they will then formally advise the external stakeholder via their preferred method of contact.

- Follow up and close out

The grievance owner will make contact with the external stakeholder/s three weeks after the grievance is resolved. When contacting the external stakeholder, the grievance owner will verify that the outcome was satisfied and also gather any feedback on the grievance process.

Minutes of the meeting will be recorded and saved.

If required, the grievance owner may need to follow up with the external stakeholder on numerous occasions to confirm all parties are satisfied.

All formal grievances are recorded in summary with the PP to identify if the complaint is a project wide issue that necessitates a system change in the implementation.

2.1.5 Public Comments

During the public comment period, the grouped project did not receive any comments.

2.2 Risks to Stakeholders and the Environment

	Risk identified	Mitigation or preventative measure taken
Risks to stakeholder participation	No risk identified	The grouped project activities distribute water purifier to household. They can decide to receive water purifiers or not. If they want, they can register to CWPDP. After CWPDP and SIPCO check that the households meet the criteria to participate in the project, before receiving water purifier, household will voluntarily sign the beneficiary agreement with SIPCO. There is no trade-off or any negative impact to their livelihood, land, food, etc... Hence no risk for stakeholders to participate in this project.
Working conditions	No risk identified	The grouped project activities create jobs for local people, water purifier manufacture, distribution unit. All of working condition such as working hours, working environment, physical pressure, rest hour, minimum wage, etc... as per Cambodian Labor and Employment Law. Hence, no risk about working conditions for stakeholders to participate in this project.
Safety of women and girls	No risk identified	In this monitoring, PP distributed 150,000 water purifiers to 150,000 households. This helps them access to sustainable and modern energy. The proposed project aims to improve quality of drinking water through dissemination of low green gas emitting safe drinking water purifier (SDWP) to provide clean drinking water for households in Kingdom of Cambodia. From there, reduce polluted indoor air due to boil drinking water. So project's water purifier is safe when using. Hence, no any risk identified relate to safety of women and girls.

Safety of minority and marginalized groups, including children	No risk identified	In this monitoring, PP distributed 150,000 water purifiers to 150,000 households. This helps them access to sustainable and modern energy. The proposed project aims to improve quality of drinking water through dissemination of low green gas emitting safe drinking water purifier (SDWP) to provide clean drinking water for households in Kingdom of Cambodia. From there, reduce polluted indoor air due to boil drinking water. So project's water purifier is safe when using. Hence, no any risk identified relate to children.
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified.	The grouped project aims at improving the quality of drinking water through dissemination of low green gas emitting safe drinking water purifier (SDWP) to provide clean drinking water for households in Cambodia. Moreover, by using water purifiers, households can drink water directly instead of boiling. This reduce reduces CO ₂ emissions into the environment. Hence the grouped project brings positive benefits to the citizens and environments. The project activity is not any pollutant into the environment.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Discrimination and sexual harassment	SIPCO will distribute water purifiers to households who are using woodfuel to boil drinking water without distinction in genders, races, religions, educational backgrounds or any other aspects. SIPCO also dedicate to the elimination of discrimination. The same is also governed by government policies and any such discrimination will have considered a punishable offence in the host country. Cambodia is also party to the "Convention on the Elimination of All Forms of Discrimination against Women" and the project has aligned its labour policies with the same.
Management experience	SIPCO has years of expertise involving communities in comparable project activities and their implementation. We have procedures in place to educate management and staff on avoiding corruption, code of conduct and business ethics. All project personnel, including firm management, adhere to these principles to make sure the business operates in compliance with all applicable laws and to the highest operational standards.

Gender equity in labor and work	SIPCO is committed to ensuring that all stakeholders, regardless of their genders, colors, faiths, educational backgrounds, or any other factors, will be given an equal chance to fill all job positions. This commitment will be fulfilled by providing equal access to employment opportunities. Before any full-time or part-time employees for the project are hired, the project proponent will advertise applicable employment opportunities by contacting village heads and posting announcements on local notice boards seeking potential candidates for the positions. Also, the initiative will encourage women, people with disabilities, and members of underrepresented groups to apply for the positions.
Human trafficking, forced labor, and child labor	SIPCO does not tolerate child labor or forced, involuntary or trafficked labor in any form. To ensure this, workers have to give a job application to SIPCO. When recruiting, SIPCO will check ID card each worker to ensure that they are of working age. Besides that, workers also submit curriculum vitae verified by local authority.

2.3.2 Human Rights

Each of our workers has a contract that states their rights and obligations. The contract details comply with Cambodia labor laws. Specific information is provided on anti-terrorism and anti-corruption efforts, including a code of conduct. Per the Core Labor Conventions of the International Labour Organization (ILO), SIPCO respects, and works in tandem with the elimination of all forms of forced or compulsory labour, the effective abolition of child labour, minimum age convention, the right to organize, and the elimination of discrimination in respect of paid positions and occupation.

2.3.3 Indigenous Peoples and Cultural Heritage

The grouped project activities involve installing water purifier and it does not involve any indigenous peoples and cultural heritage.

2.3.4 Property Rights

Disputes over rights to territories and resources	Not applicable
Respect for property rights	The grouped project activity involves distribution of water purifiers to households and only install at the informed invitation of the households and these water purifiers do not infringe or interact with property rights.

2.3.5 Benefit Sharing

Not Applicable. The grouped project activities do not impact property rights.

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure taken during the monitoring period
Impacts on biodiversity and ecosystems	No risk identified	The implementation of the grouped project does not impose any severe impacts on the ecological system in the surrounding areas. The project activities help in preventing the consumption of fuel wood by efficient fuel combustion thereby reducing deforestation and reducing indoor air pollution. The use of water purifier technology helps to avoid adverse environmental and social impacts associated with the use of non-renewable biomass for boiling water. The reduced consumption of the stated baseline fuel has sustainable benefit for all end - users included in the project activity. The implementation of the project reduce workloads involved in fuel collection, and by reducing indoor air pollution, reduce the risk of respiratory diseases. Safe drinking water technology of the project also contribute to environment protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO₂, when the combusted biomass originates from non-renewable stocks. Therefore, it has no impact to ecosystem health, so this section is not applicable
Soil degradation and soil erosion	No risk identified	
Water consumption and stress	No risk identified	
Usage of fertilizers	No risk identified	

2.4.1 Rare, Threatened, and Endangered species

Not Applicable. The grouped project activity involves distributions of water purifiers to households only and it does not involve rare, threatened and endangered species.

2.4.2 Introduction of species

Not applicable. The grouped project activities do not involve planting or species introduction.

2.4.3 Ecosystem conversion

Not applicable. The grouped project activities only distribute water purifiers to households and do not involve any ecosystem conversion.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

In this monitoring period of the grouped project, SIPCO distributed 150,000 water purifiers to households in Cambodia from 02-May-2022 to 05-Jul-2023. Project devices were transported and gathered in district points before distribution about a week before the start distribution date. Then, SIPCO in conjunction with the partner (Cambodia Women for Peace and Development) organizes one or two-day mass distributions in all communes in the district. Representation of households whose names are on the demand registration list who have been determined to be eligible to participate in the project is invited to the commune center or the distribution points to attend the communication session and receive project devices.

This monitoring period would be included 09 instances. The project start date of first crediting during this monitoring is 02-May-2022. PA 001 was included at the time of registration stage; the 09 instances (namely PA 002 to PA 010) will be included after this monitoring report is approved. Timeline of project activity instances illustrate as the table below:

Number instances	Steps				Total of WPs have been distributed as on 31-Dec-2023
	Start date of first crediting period	PAI start date (the first equipment distributed)	Inclusion date	Implementation status as on 31-Dec-2023	
PA 001	02-May-2022	02-May-2022	21-Jun-2024	- 3,000 WPs were distributed in May 2022 - 5,000 WPs were distributed in Jun 2022 - 5,000 WPs were distributed in Jul 2022 - 8,000 WPs were distributed in May 2022 - 5,000 WPs were distributed in Apr 2023	26,000
PA 002	02-May-2022	02-May-2022	To be included in this monitoring period	- 757 WPs were distributed in May 2022	757
PA 003	02-May-2022	04-Dec-2022	To be included in this monitoring period	- 2,690 WPs were distributed in Dec 2022 - 4,565 WPs were distributed in Feb 2023 - 3,435 WPs were distributed in Mar 2023	10,690
PA 004	02-May-2022	13-Feb-2023	To be included in this monitoring period	- 2,665 WPs were distributed in Feb 2023 - 10,553 WPs were distributed in Mar 2023 - 1,602 WPs were distributed in Apr 2023 - 3,574 WPs were distributed in May 2023	18,394
PA 005	02-May-2022	07-Sep-2022	To be included in this monitoring period	- 9,916 WPs were distributed in Sep 2022 - 3,800 WPs were distributed in Oct 2022	18,394
PA 006	02-May-2022	03-Oct-2022	To be included in this monitoring period	- 5,995 WPs were distributed in Oct 2022 - 9,225 WPs were distributed in Nov 2022	15,220
PA 007	02-May-2022	07-Apr-2023	To be included in this monitoring period	- 3,706 WPs were distributed in Apr 2023 - 2,835 WPs were distributed in May 2023 - 5,974 WPs were distributed in Jun 2023	12,515
PA 008	02-May-2022	06-Dec-2022	To be included in this monitoring period	- 6,393 WPs were distributed in Dec 2022 - 2,100 WPs were distributed in Jan 2023 - 6,801 WPs were distributed in Feb 2023	17,496
PA 009	02-May-2022	05-Apr-2023	To be included in this monitoring period	- 4,000 WPs were distributed in Apr 2023 - 6,00 WPs were distributed in May 2023 - 7,000 WPs were distributed in Jun 2023 - 7,000 WPs were distributed in Jul 2023	24,000
PA 010	02-May-2022	06-Oct-2022	To be included in this monitoring period	- 3,072 WPs were distributed in Oct 2022 - 4,717 WPs were distributed in Nov 2022 - 3,423 WPs were distributed in Dec 2022	11,212
Total					150,000

3.2 Deviations

3.2.1 Methodology Deviations

Not applicable. The grouped project did not apply any methodology deviations.

3.2.2 Project Description Deviations

Not applicable. The grouped project did not apply any project description deviations.

3.3 Grouped Projects

For the inclusion of new project activity instance, the project proponent ensures that it meets the eligibility criteria below:

Table 3.1: Eligibility criterion for new project activity instances

No.	Eligibility criterion - Category	Eligibility criterion – Required condition	Evidence provided and applicability
1	Meet the applicability conditions set out in the methodology applied to the project.	The new project activity instance will meet all applicability conditions of AMS – III.A.V: “Low greenhouse gas emitting safe drinking water production systems”, version 08.0.	The new project activity instances including, PA 002, PA 003, PA 004, PA 005, PA 006, PA 007, PA 008, PA 009, PA 010 – total 09 instances are compliant with the applicability conditions in methodology applied for this project AMS-III.AV “Low greenhouse gas – emitting safe drinking water production systems”. See further details on the justification for applicability of the applied methodology in table 3.2 below.
2	Use the Technologies or measures specified in the project description.	The water purification technologies include a low greenhouse gas emitting technology	Only Ecozen-25 water purifiers were distributed to households within 09 instances during this monitoring period. The ceramic mixed with silver ions (Ag ⁺) to make water filter. This design is to improve drinking water quality and retain essential mineral components. Technical Specifications of the water purifiers provided by manufacturer has been provided to the VCB.

3	Apply the technologies or measures in the same manner as specified in the project description	Technologies that use fossil fuels are not eligible. Technologies shall meet minimum criteria for specific instance type, as outline below: - Technologies shall be deployed Natural Osmosis systems with the components illustrated in section 1.11 of the PD - Flow rate: 2 – 3l/hr - Other key features of the design of the systems. Type of service, as well as performance specification based on, inter alia testing/certification - Each unit must achieve water quality for microbes defined in Drinking Water Quality Standard of Cambodia - Lifespan is 10 years	Only Ecozen-25 water purifiers were distributed within 09 instances during this monitoring.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	Are installed within the geographic area specified in Section 1.8, thus subject to the same baseline scenario determined in Section 3.3 of the project description.	09 new project activity instances during this monitoring in 09 provinces in Cambodia, detail below: - Takeo: PA 009 - Kep: PA 002 - Svay Rieng: PA 003 - Prey Veng: PA 004 - Tbong KhMum: PA 005 - Kampong Speu: PA 006 - Kampong Thom: PA 007 - Kampong Cham: PA 008 - Kampot: PA 010 This information are also be stored in the monitoring and data collection database, provided to VVB

5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	The additionality of the project activity is demonstrated by simple cost analysis that is in line with paragraph 10 (a) of Tool21 “Demonstration of additionality of small-scale project activities” (version 13.1) and paragraph 33 and 34 of TOOL01 “Tool for the demonstration and assessment of additionality”. To demonstrate additionality by Simple cost analysis, each project instance shall confirm and demonstrate that the SDWPs are distributed for free to the Users.	09 instances under this monitoring are eligible when the CME has provided the confirmation that water purifiers are distributed for free of cost to households. This is also confirmed by end-users in beneficiary agreement documents.
6	Conditions that avoid double counting of emission reductions.	The new project activity instances will: Apply a unique system (i.e. conformity letter) for SDWP in each project instance, assigning a unique ID to each SDWP and allowing to clearly identify each SDWP and to which project instance it belongs. Each SDWP installed will include project instance assignment and will have corresponding end user details (i.e. name, address). This data will be recorded as part of the beneficiary agreement and Project database. The CME has an agreement in place with residents who use drinking water from SDWPs in the project instance in which the owner transfers the rights to the emissions reductions exclusively	Each WP within 09 instances is uniquely identifiable and not part of any other CDM/VCS registered project or instance of the other grouped project. The WPs carry unique WPs comprised of the project activity instance number. The labels are below: • PA 001: CAM001-WP-00001 to CAM001-WP-26000 • PA 002: CAM002-WP-00001 to CAM002-WP-00757 • PA 003: CAM003-WP-00001 to CAM003-WP-10690 • PA 004: CAM004-WP-00001 to CAM004-WP-18394 • PA 005: CAM005-WP-00001 to CAM005-WP-13716 • PA 006: CAM006-WP-00001 to CAM006-WP-15220 • PA 007: CAM007-WP-00001 to CAM007-WP-12515 • PA 008: CAM008-WP-00001 to CAM008-WP-17496

		to the CME as part of the Carbon Rights Waiver within the Beneficiary agreement	- PA 009: CAM009-WP-00001 to CAM009-WP-24000 - PA 010: CAM010-WP-00001 to CAM010-WP-11212
7	Capacity Limit	Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: 1) Each project activity instance that exceeds one percent of the capacity limit shall be identified. 2) Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. 3) None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit	Within 09 instances included during this monitoring period are distributed no more 26,000 water purifiers and GHG emission reduction is estimated no more 58,503 tCO₂e/year per an instance, that is not exceeding 60,000 tCO₂e per year in any year of the crediting period. This is detailed in ER sheet, provided to VVB.
8	Target group	Each project instance will target end users which includes households who use traditional cookstove to boil drinking water.	09 instances under the monitoring period within Cambodia satisfies the criteria. Each household must sign in a beneficiary agreement to commit that they are using traditional cookstove to boil drinking water.
9	Occur within one of the designated geographic areas	New project activity instances will be located within the geographic boundaries of Cambodia.	The geographic boundary of 9 instances under in this monitoring is illustrated to be within Cambodia

	specified in the project description.	The new project instances geographic location will be defined in the monitoring reports.	(see section 1.8). The location date captured from each household who received the project devices will be stored in the database file and agreement. They are provided to VVB at the time of verification.
10	Comply with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient	New project activity instances must comply set of eligibility criteria for the inclusion of new project activity instances in the table	The new project activity instances during this monitoring comply set of eligibility criteria for the inclusion of new project activity instances as described in this table of the document
11	Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body	New Project Activity Instances must comprise monitoring plans that outline the technical, financial, geographic and other relevant information to enable sampling by the validation/verification body.	09 instances for baseline surveys and applicable provisions is submitted alongside this monitoring report. Monitoring data for this instances is provided to the VVB at verification.
12	Be validated at the time of verification against the applicable set of eligibility criteria	New project activity instances must be validated at the time of verification against the applicable set of eligibility criteria	09 project activity instances under this project will be validation at the time of verification against the applicable set of eligibility criteria.
13	Be eligible for crediting from the start date of the instance through to the end of the project crediting period (only).	New PI within this grouped project shall be eligible for crediting from its start date through to the end of the project crediting period.	09 instances which is included during this monitoring, has been being eligible for crediting from its operating start date of grouped project through to the end of the project crediting period. Same can

			be verified by ER spreadsheet being submitted to the VVB.
14	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance (i.e., the date upon which the project activity instance began reducing or removing GHG emissions)	New PIs will demonstrate ownership by the project proponent, from the start date of the PI	Project ownership, as described in Section 1.7 of the registered project description, is applicable to 09 instances included in this grouped project.
15	Have a start date that is the same as or later than the grouped project start date	Only PIs having a start date that is the same as or later than the GP start date will be included in the grouped project. The start date of GP is the date of distribution of first unit as per section 1.6 of this document. And subsequent additions will have start date after GP start date only	The start date of 09 instances are the same as or later than the GP start date is 02-May-2022. Same can be verified by ER spreadsheet being submitted to the VVB.
16	Not leave one VCS project and subsequently enroll in another VCS project.	All of new PIs within this grouped project is a new activity and shall not leave one VCS project and subsequently enroll another VCS project	09 instances under the grouped project distributed WPs in 09 provinces within Cambodia. All of them are new activities and do not leave one VCS project and subsequently enroll another VCS project.
17	The project proponent shall include in a singular project all project activity instances within ten kilometers of another instance of the same	The distance of new PIs within this grouped project is more than 10 km.	The distance of 09 instances within the grouped project and with the same project proponent in this monitoring period is more than 10 km. PP prioritizes one instance per province. In case, the same province more than one instance,

	project activity and with the same project proponent (i.e., instances of the same project activity may not be spread across more than one project if they are within ten kilometers of each other).	there are only one instance in one district to ensure distance eligibility. Also, PP database administrator checks GPS according to database file before distributing. See further distance details for each instance in the table 3.3 below. The address is detailed in databased file which is also provided to VVB in the verification period.
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Table 3.2: Justification for applicability of the applied methodology of new project activity instances

No	Methodology Requirement	Justification
1.	Prior to the implementation of the project activity, a public distribution network supplying SDWP) to the project boundary does not exist.	Households in the 09 new PAIs during this monitoring period do not yet have access to a water system. This is confirmed in the confirmation letters and the beneficiary agreements by distribution partners and representatives of households, respectively. These documents are also provided to VVB in the verification period.
2.	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 “interim” 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 laboratory efficacy testing that, at a minimum, includes quantitativemicrobial 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).	The drinking water purifier supply use various water treatment filters according to the water quality of water sources to meet the national standard or guideline of Cambodia. During this monitoring period, PP conducted microbiological and water quality testing for representative samplings in the 09 PAIs. All of samples meet microbes defined in Drinking Water Quality Standards. The testing certificates are provided to VVB in the verification period.

3.	In cases where the life span of the water treatment technologies is shorter than the 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.	The lifespan of the water purifier is 10 years, which is the length of the crediting period of the project instance.
4.	It should be demonstrated that the project appliances use technologies that meet the technology standards as per paragraph 4(b) of approved methodology AMS-III.AV version 08.0, and that they deliver microbiologically safe drinking water.	Each water purifier in 09 PAIs confirms to the technology standards as per paragraph 4(b) of approved methodology AMS-III.AV Version 08. The outlet quality water meets microbes defined in Drinking Water Quality Standards for drinking waters.
5.	The use of this methodology in a project of activity under the grouped projects is legitimate if the leakage is estimated and accounted for as per the relevant provisions of AMS-I.E version 13.0 under the section for the grouped projects.	Leakage is calculated by applying a net to gross adjustment factor of 0.95 to account for leakages in 09 PAIs during this monitoring period. Refer to the ER calculation sheet.

Table 3: Distances for each project activity instance (unit: kilometer)

	PA 001	PA 002	PA 003	PA 004	PA 005	PA 006	PA 007	PA 008	PA 009	PA 010
PA 001	0	86	198	170	254	115	267	201	63	97
PA 002	86	0	273	245	328	157	324	258	148	30
PA 003	198	273	0	63	97	218	257	137	188	271
PA 004	170	245	63	0	99	190	215	95	161	243
PA 005	254	328	97	99	0	214	189	60	244	316
PA 006	115	157	218	190	214	0	208	154	120	150
PA 007	267	324	257	215	189	208	0	121	263	321
PA 008	201	258	137	95	60	154	121	0	197	256
PA 009	63	148	188	161	244	120	263	197	0	146
PA 010	97	30	271	243	316	150	321	256	146	0

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	QPW _{pp}	
Data unit	Litres	
Description	Average volume of drinking water per person per day	
Source of data	Calculated based on survey records	
Value applied	PAI	QPW _{pp}
	PA 001	5.15
	PA 002	5.11
	PA 003	5.19
	PA 004	5.18
	PA 005	5.09
	PA 006	5.13
	PA 007	5.12
	PA 008	5.17
	PA 009	5.15
	PA 0010	5.10
Justification of choice of data or description of measurement methods and procedures applied	QPW _{pp} data based on the survey records, what is conducted by participant project.	
Purpose of data	Calculation of baseline emissions	
Comments	-	

Data / Parameter	LS
Data unit	Years
Description	Lifespan of water treatment technologies
Source of data	Manufacturer's specifications
Value applied	10
Justification of choice of data or description of measurement methods and procedures applied	Manufacture specifications
Purpose of data	-
Comments	Lifespan of water treatment technologies shall be 10 years.

Data / Parameter	nwb
Data unit	%
Description	Efficiency of water boiling system being replaced
Source of data	Efficiency of the water boiling systems being replaced. Use one of the options below: The efficiency of the water boiling system shall be established using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is encountered; 0.10 default value may be optionally used if 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; for the rest of the systems using woody biomass 0.2 default value may be optionally used; 0.5 default value may be used if the replaced system or the system that would have been used is a fossil fuel combusting system.
Value applied	10%
Justification of choice of data or description of measurement methods and procedures applied	This shall be determined based on option (b) detailed under the row above "Source of data" because only households who using three stone fire are taken into account for supplying safe drinking water.
Purpose of data	Calculation of baseline emissions
Comments	The project proponents will distribute the SDWPs for the households who have used wood fuel to boil drinking water

Data / Parameter	BL _{fuel,i}	
Data unit	Fraction	
Description	Proportions of baseline fuel type I (NBR and or fossil fuels)	
Source of data	Survey	
Value applied	PAI	BL _{fuel,i}
	PA 001	0.9502
	PA 002	0.9447
	PA 003	0.9578
	PA 004	0.9622
	PA 005	0.9599
	PA 006	0.9494
	PA 007	0.9432
	PA 008	0.9454
	PA 009	0.9502
	PA 0010	0.9559

Justification of choice of data or description of measurement methods and procedures applied	The baseline survey data show that the major source of fuel is fire wood
Purpose of Data	Calculation of baseline emissions
Comments	The baseline scenario established through the survey shows that proportion of the people used traditional stoves using woody biomass to boil water in the absence of the project activity.

Data / Parameter	f_i
Data unit	Fraction
Description	Factor to determine amount of non-renewable fuels
Source of data	Calculation
Value applied	0.7044
Justification of choice of data or description of measurement methods and procedures applied	For the wood fuel, the value established from “Calculation of the fraction of non-renewable biomass (fNRB) for Cambodia” report what was made by the Third Party Organization. This report estimates the fNRB for Cambodia using the latest guidance from the Clean Development Mechanism (CDM TOOL30 EB 115 Annex 22 v4.0 2022) “Calculation of fraction of non-renewable biomass”. With regards to the calculations, the third party organization analyzes the fNRB based on satellite data availability, Geographic Information System (GIS) and data modelling which provided the most reliable measuring method. For fossil fuel, the default value is 1.0
Purpose of Data	Calculation of baseline emissions
Comments	-

Data / Parameter	$EF_{\text{projected fossil fuel}}$
Data unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non – renewable woody biomass.
Source of data	AMS – III.AV, version 08.0 IPCC, chapter 2, table 2.2
Value applied	85.7
Justification of choice of data or description of measurement methods and procedures applied	As per AMS-III.AV, Version 08.0 and IPCC, Chapter 2, table 2.2
Purpose of Data	Calculation of baseline emissions
Comments	This parameter shall remain fixed for the monitoring periods

1	X_{boil}																						
Data unit	%																						
Description	Fraction of the population serviced by the project activity for which the common practice of water purification is or would have been water boiling.																						
Source of data	Survey																						
Value applied	<table> <tr> <th>PAI</th><th>X_{boil}</th></tr> <tr><td>PA 001</td><td>0.9848</td></tr> <tr><td>PA 002</td><td>0.9832</td></tr> <tr><td>PA 003</td><td>0.9873</td></tr> <tr><td>PA 004</td><td>1.000</td></tr> <tr><td>PA 005</td><td>1.000</td></tr> <tr><td>PA 006</td><td>0.9852</td></tr> <tr><td>PA 007</td><td>0.9811</td></tr> <tr><td>PA 008</td><td>0.9790</td></tr> <tr><td>PA 009</td><td>0.9848</td></tr> <tr><td>PA 0010</td><td>0.9769</td></tr> </table>	PAI	X_{boil}	PA 001	0.9848	PA 002	0.9832	PA 003	0.9873	PA 004	1.000	PA 005	1.000	PA 006	0.9852	PA 007	0.9811	PA 008	0.9790	PA 009	0.9848	PA 0010	0.9769
PAI	X_{boil}																						
PA 001	0.9848																						
PA 002	0.9832																						
PA 003	0.9873																						
PA 004	1.000																						
PA 005	1.000																						
PA 006	0.9852																						
PA 007	0.9811																						
PA 008	0.9790																						
PA 009	0.9848																						
PA 0010	0.9769																						
Justification of choice of data or description of measurement methods and procedures applied	X_{boil} data based on survey records																						
Purpose of Data	The data is used for baseline emission calculations.																						
Comments	-																						

Data / Parameter	P_h																						
Data unit	Fraction																						
Description	Averaged number of person per household																						
Source of data	Survey																						
Value applied	<table> <tr> <th>PAI</th><th>P_h</th></tr> <tr><td>PA 001</td><td>4.6</td></tr> <tr><td>PA 002</td><td>4.58</td></tr> <tr><td>PA 003</td><td>4.52</td></tr> <tr><td>PA 004</td><td>4.93</td></tr> <tr><td>PA 005</td><td>4.65</td></tr> <tr><td>PA 006</td><td>4.61</td></tr> <tr><td>PA 007</td><td>4.53</td></tr> <tr><td>PA 008</td><td>4.43</td></tr> <tr><td>PA 009</td><td>4.60</td></tr> <tr><td>PA 0010</td><td>4.40</td></tr> </table>	PAI	P_h	PA 001	4.6	PA 002	4.58	PA 003	4.52	PA 004	4.93	PA 005	4.65	PA 006	4.61	PA 007	4.53	PA 008	4.43	PA 009	4.60	PA 0010	4.40
PAI	P_h																						
PA 001	4.6																						
PA 002	4.58																						
PA 003	4.52																						
PA 004	4.93																						
PA 005	4.65																						
PA 006	4.61																						
PA 007	4.53																						
PA 008	4.43																						
PA 009	4.60																						
PA 0010	4.40																						

Justification of choice of data or description of measurement methods and procedures applied	Survey
Purpose of Data	The data is used for baseline emission calculations.
Comments	The parameter is used to calculate parameter P_y

4.2 Data and Parameters Monitored

Data / Parameter	P_y			
Data unit	Number			
Description	Population who consumes the purified water serviced by the project activity in year y			
Source of data	Survey Records			
Description of measurement methods and procedures to be applied	Water purifier distribution database and Monitoring survey records			
Frequency of monitoring/recording	Annual			
Value monitored	PAI	N_y	P_h	$P_y = N_y \times P_h$
	PA 001	26,000	4.6	119,600
	PA 002	757	4.58	3,467
	PA 003	10,690	4.52	48,319
	PA 004	18,394	4.93	90,682
	PA 005	13,716	4.65	63,779
	PA 006	15,220	4.61	70,164
	PA 007	12,515	4.53	56,693
	PA 008	17,496	4.43	77,507
	PA 009	24,000	4.60	110,400
	PA 0010	11,212	4.40	49,333
	Total	150,000		689,944
Monitoring equipment	-			
QA/QC procedures to be applied	A 95 /10 confidence / margin of error is applied for the sampling parameter as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0			
Purpose of the data	Calculation the baseline emission			

Calculation method	Calculated by the quality of water purifiers are distributed x the average of number of people in a household. The number of operating water purifiers have been determined on a sampling basis. The population in the database was categorized on the basis random sampling was applied to identify the sample. The identified samples were monitored for operational status of water purifiers. The results from monitoring were used to calculate N_y as follows: $N_y = (n_{\text{operational}}/n_{\text{total}}) * N_{\text{distributed}}$ Where: $n_{\text{operational}}$ = Number of samples in operation n_{total} = Total of samples. $N_{\text{distributed}}$ = Number of water purifiers distributed
Comments	-

Data / Parameter	QPWy		
Data unit	litres		
Description	Quantity of purified water in year y		
Source of data	Calculated		
Description of measurement methods and procedures to be applied	This parameter can be calculated based on equation: QPWy = Py x min (QPWpp;5.5) x number of operating days (244 days for vintage 1 and 365 days for vintage 2)		
Frequency of monitoring/recording	Annual		
Value monitored	PAI	Vintage 1	Vintage 2
	PA 001	91,216,710	213,740,656
	PA 002	4,305,152	6,466,587
	PA 003	1,666,325	81,382,729
	PA 004	-	133,520,227
	PA 005	34,739,441	118,492,558
	PA 006	24,806,602	131,378,956
	PA 007	-	67,770,586
	PA 008	3,438,603	133,346,154
	PA 009	-	123,130,102
	PA 010	13,581,743	91,833,007
	Total	173,754,577	1,101,061,563
		1,278,214,977 ³	
	Monitoring equipment	-	

³ Detailed calculation refers to ER spreadsheet

QA/QC procedures to be applied	NA
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	m
Data unit	fraction
Description	Fraction of functional appliances that are providing the SDWP
Source of data	Microbiological testing certificates are conducted by the laboratory named General Department of Accreditation of Cambodia from 17th to 28th December 2023. The Laboratories have been assessed and confirmed to comply with the requirements of international standards ISO/IEC 17025:2017 according to the accreditation certificate of Bureau Veritas
Description of measurement methods and procedures to be applied	For determination of functional appliances that providing the SDWP, an across PA sampling based on WP vintage with the applied 95/10 confidence precision level. Total of 43 samples were microbiological testing at the Laboratory and all samples meet conditions following: • Using filtration ceramic with Natural Osmosis systems to create safe drinking water • All water purifiers are still operating in good condition as well as physical signs that are observable (e.g. wetness of the unit, water in storage receptacle, functionality of parts) • 43 samples are tested by method ISO 9308 and 7899 and met the Microbiological parameters required by Drinking Water Quality Standards for drinking water
Frequency of monitoring/recording	Annually
Value monitored	1 Testing results for total coliforms, E. Coli and Fecal Streptococci of 43 representative samples are all not detected
Monitoring equipment	-

QA/QC procedures to be applied	Quality of safe drinking water is confirmed by third parties' institution annually. There are the third parties that conducted the test during monitoring period. The lab has been recognized by VILAS in accordance with international standards ISO/IEC 17025.
Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	A statistically valid sample of the appliances can be used to determine the parameter value, as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities". 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters

Data / Parameter	Check for SDWP public distribution network
Data unit	-
Description	Annual check if there is a public distribution network supplying SDWP is installed
Source of data	Before distributing, there is the confirmation letter with local authority that the households receiving water purifier do not have access to SDWP public distribution network. Moreover, this will also be checked by questionnaire survey during monitoring period.
Description of measurement methods and procedures to be applied	1. Before distribution at new area, the CWPD will send an official letter confirming that the WP distribution locations are places that do not have access to clean water. This confirmation has been provided to VVB for checking in supporting documents. 2. The random survey by questionnaires for end user were used to check if there is a public distribution network supplying SDW is installed. If the household accessed to safe drinking water, the emission reduction will be discarded (according to proportion). Monitoring shall include annual check if there is public distribution network supplying SDW
Frequency of monitoring/recording	Annually
Value monitored	1 All samples selected for monitoring have not yet haven access to public distribution network
Monitoring equipment	-
QA/QC procedures to be applied	-

Purpose of the data	Calculation of baseline emissions
Calculation method	-
Comments	If SDWP is made available through a public distribution network during the crediting period, the emission reductions pertaining to the households/buildings supplied by the public system cannot be claimed from that point onwards. This condition should be checked annually during the crediting period.

Data / Parameter	Quality of safe drinking water
Data unit	-
Description	The quality of the safe drinking water
Source of data	Testing's quality of safe drinking water is conducted by the laboratory named General Department of Accreditation of Cambodia from 17th to 28th December 2023. The Laboratories have been assessed and confirmed to comply with the requirements of international standards ISO/IEC 17025:2017 according to the accreditation certificate of Bureau Veritas
Description of measurement methods and procedures to be applied	PP selected 10 samples to monitor for this parameter based on the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 09.0), which refers to the Guidelines for Sampling and Surveys for CDM Project Activities and Programmes of Activities (Version 04). The quality of safe drinking water is tested by the laboratory named General Department of Accreditation of Cambodia. All samples are meet requirement of Drinking Water Quality Standards for drinking water
Frequency of monitoring/recording	Once every two years
Value applied	1 All samples selected for this monitoring period meet requirement of Drinking Water Quality Standards for drinking water
Monitoring equipment	-
QA/QC procedures to be applied	Quality of safe drinking water is confirmed by third parties' institution annually. There are the third parties that conducted the test during monitoring period. The laboratory has been recognized by VILAS in accordance with international standards ISO/IEC 17025.

Purpose of data	Calculation of baseline emission
Calculation method	-
Comments	Emission reductions cannot be claimed if project activity fails to meet SDWP standards

4.3 Monitoring Plan

The monitoring procedures and sampling plan for the grouped project is in-line with AMS- III.AV Low greenhouse gas emitting safe drinking water production systems (version 08.0) and the procedures outlined of the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 09.0), which refers to the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 04).

(a) For new baseline survey:

The baseline survey for the first project instance in Takeo province was validated during the time of the validation stage. Before distributing water purifier under new project instances, PP has conducted baseline survey for each province. During this verification period, PP has distributed water purifiers to households in Kep, Svay Rieng, Prey Rieng, Tbong Khmum, Kampong Speu, Kampong Thom, Kampong Cham and Kampot province which were surveyed for baseline scenario on April 2022, October 2022, November 2022, July 2022, August 2022, January 2023, October 2022 and July 2022, respectively.

SIPCO coordinated with the Women's Unions of the provinces to conduct baseline surveys for each new area (project area). From the list of households selected by the Women's Union, the PP calculates the sample size by establishing a 10% of error and confidence level up to 95% to determine the sample size for parameters $N_{y,i,j}$ the following equation is used:

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

Where:

- n : Sample size
- N : Population size (Total number of households/water purifier)
- p : Expected proportion
- 1.96 : Represents the 95% confidence required
- 0.1 : Represents the 10% relative precision

Applying the random sampling technical, the household numbers are randomly chosen from the required sample size as calculated by the PP. To ensure the survey result is representative of the entire population, the dissimilarity (such as village, individuals...) chosen randomly such that each element (or unit) of the population has the same probability of being selected. The survey method has been use is face to face interview by questionnaires. The details of the calculation and selected samples are provided in the baseline surveys. The summary result of sample size for each new area as following as:

New project area (Province)	Population	Calculated sample size	Actual sample size
Kep	2,500	334	416
Svay Rieng	26,000	379	474
Prey Vieng	52,000	382	476
Tbong Khmum	40,000	381	476
Kampong Speu	42,000	381	476
Kampong Thom	32,000	380	475
Kampong Cham	55,000	382	476
Kampong	40,000	381	476

(b) For monitoring survey

1. Sampling design

a. Objectives and reliability requirements

As a rule, the most appropriate confidence/precision levels required by the methodology AMS-III.AV (version 08.0) and the Sampling Standard are applied whenever sampling is undertaken. According to the Sampling Standard, 95/10 reliability is to be applied whenever sampling across a group of instances, which is typically be the case for this grouped project. In the case of conducting instance-specific sampling, the methodology AMS-III.AV (version 08.0) requires 90/10 confidence/precision if annual sampling is applied, or 95/10 confidence/precision if biennial (every two years) sampling is applied.

The objective of the sampling effort is to meet the monitoring requirements set forth in the methodologies AMS-III.AV (Version 08.0). Monitoring is carried out on an annual basis (or biennial for specific parameters when allowed by the methodology. As the grouped project progresses and the number of instance increases, the sampling plan can apply to a group of instances. This is applicable to instance types as long as homogeneity can be demonstrated. When homogeneity cannot be demonstrated the CME may monitor instances individually. All monitoring is coordinated by the PP.

Parameter	Description of parameter	Monitoring frequency
P_y	Population who consumes the purified water serviced by the project activity in year y	At least annually
Check for SDW public distribution network	Annual check if there is a public distribution network supplying SDW is installed	At least annually
m	Fraction of functional appliances that are meeting the SDWP Standard	At least annually
Quality of safe drinking water	The quality of the safe drinking water	At least every two years

b. Target population

The target population (Users – including households) is the total population served under the specific instance project activity or group of instances.

c. Sampling method

Sampling is conducted using stratified random sampling techniques, and detailed calculations are provided within the monitoring plan as per CDM guidelines “Sampling and surveys for CDM project activities and programmes of activities”. Optionally, other sampling approaches may be used in accordance with “Sampling and surveys for CDM project activities and programmes of activities” and Guideline for Sampling and Surveys for CDM Project.

d. Sample size

The sample size is calculated using the EB 86, “Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 04.0.

According to the “Standard for sampling and surveys for CDM project activities and programme of activities”, if there is more than one parameter to be estimated, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen as sampling effort with one common survey, or separate sampling efforts and surveys are undertaken for each parameter.

Thus, there are different equations to calculate a required sample size for different situations. Different equation that will be used, depends on the type of parameter of interest, that is either:

For all of the parameters a 90% confidence is required where the margin of error in the estimate is not more than 10% and assuming annual sampling for a single instance. If sampling is done across a group of instance or biennially, parameters shall have a 95% confidence level.

Below formulae assume sampling to be done across a group of instances and hence calculations are demonstrated with a 95% confidence level.

1. For parameter P_y and the fraction of SDWP public distribution network

For population who consumes the purified water serviced by the project activity in year y (P_y) and check for SDWP public distribution network. The equation is used:

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

Where:

- N : Sample size
- $N=N_y$: Population who consumes the purified water serviced by the project activity in year y .
- p : Our expected proportion of the installed water purification systems will be in use and operating at the specified efficiency.

1.96 : Represents the 95 % confidence required

0.1 : Represents the 10 % relative precision

Based on the above assumption, the resulting sampling size for a 95/10 confidence/precision is calculated for total population size, the result below:

Monitoring Parameter	Water purifier Operating Fraction for determination of P_y and check for SDWP public distribution network			
Sampling frame (s)	Given year of distributing water purifier			
Sampling approach	Stratified random sampling			
Sampling population (Batch)	Water purifier population	Expected operational proportion	Calculated Sample Size (n)	Actual Monitored sample size
Ecozen-25 2022	70,988	0.90	20	25
Ecozen-25 2023	79,012	0.90	23	29
Sample size determination				
Estimated Operation (p)				0.90
$V_{operation} = p(1-p)/p^2$				0.111
Sample Size required (SOF)				43

Additionally, as per registered sampling plan, it's recommended that the project proponent may choose to use the same samples to monitor more than one parameter, where parameters have same units. Sampling more than one parameter within the same sample (light points) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter. Also, oversampling is strongly encouraged, not only to compensate for any attrition, outliers or nonresponse associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. We expect the response rate from the sampled households to be 80%. Thus, we would decide to sample $43/0.8 = 54$ samples. A total of 54 samples were selected.

2. For parameter m

For fraction of functional appliances that are meeting the SDWP Standard (m), this is proportion value so the equation is used:

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

Where:

- n : Sample size
- N=Ny : Number of SDWPs in the target population
- p : Our expected proportion of the installed water purification systems will be in use and operating at the specified efficiency)
- 1.96 : Represents the 95 % confidence required
- 0.1 : Represents the 10 % relative precision

Based on the above assumptions, the water purifier resulting sampling size for a 95/10 confidence/precision is calculated for total population size, the result below:

Monitoring Parameter	Function fraction (m)		
Sampling frame (s)	Given year of distributing water purifier		
Sampling approach	Stratified random sampling		
Sampling population (Batch)	Water purifier population	Expected operational proportion	Calculated Sample Size (n)
Ecozen-25 2022	70,988	0.90	20
Ecozen-25 2023	79,012	0.90	23
Sample size determination			
Estimated Operation (p)			0.90
$V_{operation} = p(1-p)/p^2$			0.111
Sample Size required (SOF)			43

Since parameters Py and check for SDWP public distribution network and m share the same sampling units, project proponent may choose to have one common survey for these two parameters. Other hand, to save cost for testing parameter m, we choose 43 samples available for parameter m from 54 samples of parameter Py and Check for SDW public distribution network.

3. For Quality of safe drinking water

Water quality monitoring is undertaken annually or biennially on a sampling basis. This complies with requirement of Drinking Water Quality for drinking water of the Kingdom of Cambodia. To ensure compliance of the water quality with: (i) at a minimum the “interim” performance target as per “Evaluating household water treatment options: Health based targets and microbiological performance specifications” (WHO, 2011); or (ii) an applicable national standard or guideline, the water quality is monitored on sample basis for contamination with Escherichia coli (E. coli). A test for E. coli colony forming units (CFU) in 100 ml of water or an equivalent quantitative test for E. coli CFU is used. The fraction of water quality measurements providing water of insufficient quality is excluded from the calculation of emission reductions.

$$1.96^2 NV$$

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

$$V = \left(\frac{SD}{mean} \right)^2$$

Where:

n : Sample size

N=N_y : Number of SDWPs in the target population.

1.96 : Represents the 95% confidence required

0.1 : Represents the 10% relative precision

Mean : Our expected mean

SD : Our expected standard deviation

Monitoring Parameter	Water Quality				
Sampling approach	Stratified random sampling based on year of distributing water purifier				
Sampling population (Batch)	Population Size	Expected Mean	Expected Standard Deviation	Calculated Sample Size	Actual Monitored sample size
Ecozen-25 2022	70,988	0.9000	0.090	3	4
Ecozen-25 2023	79,012	0.9000	0.090	4	6
Sample size determination					
Mean				0.9000	
Standard Deviation (SD)				0.0900	
$V_{\text{mean}} = (SD/\text{mean})^2$				0.01000	
Minimum Sample Size required				4	
t-Distribution sample size adjustment			Iteration 1	11	
			Iteration 2	5	
			Iteration 3	8	
			Iteration 4	6	
			Iteration 5	7	
			Iteration 6	6	

As the sample size calculated above is less than 30, the Student's t-distribution has been used to calculate the sample size (in accordance with paragraph 13 of standard: sampling and survey for CDM project activities and programmes of activities (version 09.0)).

The adjusted sample size obtained after applying Student's t-distribution is 7. PP expected response rate from the sampled households to by 70%. Thus, we would decide to sample $7/0.7=10$ samples.

Finally, The number of samples for 4 parameters below:

Parameter	Sample size
P _y and water supply system fraction	54
m	43
water quality	10

Analysis of data collected and confidence/precision achieved

Analysis of data monitored through sampling revealed the following results:

RESULT FOR OPERATION FRACTION Py			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored Operation
Ecozen- 25 2022	70,988	25	1.00
Ecozen- 25 2023	79,012	29	
Reliability Check			
Samples Monitored			54
Utilization Measured			0.47
Standard Error of Utilization			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, reliability level met
Lower Bound confidence value			Not applicable

RESULT FOR PUBLIC WATER SUPPLY SYSTEM FRACTION			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored Operation
Ecozen- 25 2022	70,988	25	1.00
Ecozen- 25 2023	79,012	29	
Reliability Check			
Samples Monitored			54
Utilization Measured			1.00
Standard Error of Utilization			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, reliability level met
Lower Bound confidence value			Not applicable

RESULT FOR PARAMETER WATER QUALITY			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored water quality fraction
Ecozen- 25 2022	70,988	4	1.00
Ecozen- 25 2023	79,012	6	
Reliability Check			
Samples Monitored			10
Utilization Measured			1.00
Standard Error of Utilization			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, reliability level met
Lower Bound confidence value			Not applicable

RESULT FOR PARAMETER m			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored microbiological quality fraction (m)
Ecozen- 25 2022	70,988	20	1.00
Ecozen- 25 2023	79,012	23	
Reliability Check			
Samples Monitored			43
Utilization Measured			1.00
Standard Error of Utilization			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, reliability level met
Lower Bound confidence value			Not applicable

For detailed calculations refer to ER sheet.

(a) Sample Frame

The sampling frame refers to all the SDWPs in the database.

This project is either sampled separately and independently, or grouped together under a single sampling plan across instance, in each case using strata (each project activity instance) that have unique combinations of these factors.

The total number of appliances installed under the grouped project and operated per type of technology in this monitoring period are the total sampling frame per distributed technology. Each water purifier is labelled with a unique serial number. Hence, the water purifiers were selected randomly after arranging them in chronological order of date of distribution and assigning a sampling number in each strata (each project activity instance). To ensure a random selection of WPs from the project database, samples are drawn by using the random number generator. The populations of each strata are combined together, the sample size is determined, and a single survey is undertaken across the project activities to collect data. To ensure the survey result is representative of the entire population, the dissimilarity (such as WPs age, vintage in which they are operating) among the strata's is taken into account in the sample size calculation. The WPs of same type, vintage in which they are operating and grouped in the same strata.

(f) Survey implementation schedule

The sample to be surveyed is drawn randomly with a geographical spread within the project boundary of the project activity instance. The survey was conducted through: physical on-site visit (face-to-face) from 16 to 23 December 2023. For the physical on-site visit (face-to-face interview), data is collected through hardcopy questionnaires.

Training

Before implementing survey, SIPCO conducted a training about sampling and survey for employees on 13-Dec-2023. Attendees included Director, manager of project coordination, manager of project consultant and employees participating in the survey. Major focus is on understanding collection of data as per the survey questionnaire

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emissions shall be calculated as follows:

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

Where:

BE_y : Baseline emissions during the year y in (tCO₂e)

QPW_y : Total quantity of purified water by the project in year y (litres)

m : Fraction of functional appliances that are meeting the SDWP standards (%). Only

project appliances that (i) use technologies that meet the technology standards as per paragraph 4(b) and (ii) are operating or replaced by an equivalent in service appliance and (iii) deliver microbiologically safe drinking water, are counted for emission reductions.

X_{boil} : Fraction of the population served by the project activity for which the common practice of water purification is or would have been water boiling. This shall be 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 fossil fuel, the value to be applied is 1.

$EF_{projectedfossilfuel,i}$: Emission factor of the fossil fuel substituted (tCO₂/TJ).

The grouped project completely distributed 150,000 water purifiers to households to 09 provinces in Cambodia. According to the results of a random survey of end-users in each project activity, the result of the parameter P_h , QPW_{pp} , X_{boil} , $BL_{fuel,i}$ for each project activity instance:

PAI	P_h	QPW_{pp}	X_{boil}	$BL_{fuel,i}$
PA 001	4.6	5.15	0.9848	0.9502
PA 002	4.58	5.11	0.9832	0.9447
PA 003	4.52	5.19	0.9873	0.9578
PA 004	4.93	5.18	1.000	0.9622
PA 005	4.65	5.09	1.000	0.9599
PA 006	4.61	5.13	0.9852	0.9494
PA 007	4.53	5.12	0.9811	0.9432
PA 008	4.43	5.17	0.9790	0.9454
PA 009	4.60	5.15	0.9848	0.9502
PA 010	4.40	5.10	0.9769	0.9559

The quantity of purified water in year is calculated as following:

$$QPW_y = P_y \times QPW_{pp}; 5.5) \times 365 \times \text{Proportion active days in year}$$

Result for each project activity instance detailed below:

PAI	Quantity	Date of distribution water purifier	Year of distributing WP	Vintage 1			Vintage 2		
				Start date of water purifier crediting (considering the start date of the monitoring vintage)	Equivalent Operational year in the monitoring vintage	QPW _y	Start date of water purifier crediting (considering the start date of the monitoring vintage)	Equivalent Operational year in the monitoring vintage	QPW _y
PA 001	1,000	2-May-22	2022	3-May-22	0.67	5,756,670	1-Jan-23	1.00	8,646,850
	2,000	3-May-22	2022	4-May-22	0.66	11,465,960	1-Jan-23	1.00	17,293,700
	1,000	3-Jun-22	2022	4-Jun-22	0.58	4,998,590	1-Jan-23	1.00	8,646,850
	2,000	4-Jun-22	2022	5-Jun-22	0.58	9,949,800	1-Jan-23	1.00	17,293,700
	2,000	5-Jun-22	2022	6-Jun-22	0.57	9,902,420	1-Jan-23	1.00	17,293,700
	1,075	5-Jul-22	2022	6-Jul-22	0.49	4,558,548	1-Jan-23	1.00	9,295,364
	1,960	6-Jul-22	2022	7-Jul-22	0.49	8,264,967	1-Jan-23	1.00	16,947,826
	1,965	7-Jul-22	2022	8-Jul-22	0.48	8,239,500	1-Jan-23	1.00	16,991,060
	1,320	3-Aug-22	2022	4-Aug-22	0.41	4,690,620	1-Jan-23	1.00	11,413,842
	1,680	4-Aug-22	2022	5-Aug-22	0.41	5,930,081	1-Jan-23	1.00	14,526,708
	2,001	5-Aug-22	2022	6-Aug-22	0.41	7,015,746	1-Jan-23	1.00	17,302,347
	2,999	6-Aug-22	2022	7-Aug-22	0.40	10,443,808	1-Jan-23	1.00	25,931,903
	2,400	3-Apr-23	2023	-	-	-	4-Apr-23	0.75	15,464,832
	2,600	4-Apr-23	2023	-	-	-	5-Apr-23	0.74	16,691,974
PA 002	757	2-May-22	2022	3-May-22	0.67	4,305,152	1-Jan-23	1.00	6,466,587
PA 003	1,092	4-Dec-22	2022	5-Dec-22	0.07	691,659	1-Jan-23	1.00	9,350,209
	1,598	5-Dec-22	2022	6-Dec-22	0.07	974,666	1-Jan-23	1.00	13,682,814
	2,141	11-Feb-23	2023	-	-	-	12-Feb-23	0.88	16,222,769
	2,424	12-Feb-23	2023	-	-	-	13-Feb-23	0.88	18,310,250
	1,931	10-Mar-23	2023	-	-	-	11-Mar-23	0.81	13,408,487
	1,504	11-Mar-23	2023	-	-	-	12-Mar-23	0.81	10,408,200
PA 004	2,665	13-Mar-23	2023	-	-	-	14-Mar-23	0.80	19,940,751
	2,694	6-Mar-23	2023	-	-	-	7-Mar-23	0.82	20,639,327
	2,770	7-Mar-23	2023	-	-	-	8-Mar-23	0.82	21,150,841
	2,473	8-Mar-23	2023	-	-	-	9-Mar-23	0.82	18,819,889
	2,616	9-Mar-23	2023	-	-	-	10-Mar-23	0.81	19,841,334
	1,602	2-Apr-23	2023	-	-	-	3-Apr-23	0.75	11,168,680
	2,132	4-May-23	2023	-	-	-	5-May-23	0.66	13,121,423
	1,442	5-May-23	2023	-	-	-	6-May-23	0.66	8,837,983

PA 005	2,000	7-Sep-22	2022	8-Sep-22	0.32	5,443,755	1-Jan-23	1.00	17,278,005
	2,181	8-Sep-22	2022	9-Sep-22	0.31	5,884,794	1-Jan-23	1.00	18,841,664
	2,796	9-Sep-22	2022	10-Sep-22	0.31	7,478,015	1-Jan-23	1.00	24,154,651
	2,939	10-Sep-22	2022	11-Sep-22	0.31	7,790,913	1-Jan-23	1.00	25,390,028
	2,000	1-Oct-22	2022	2-Oct-22	0.25	4,307,667	1-Jan-23	1.00	17,278,005
	1,800	2-Oct-22	2022	3-Oct-22	0.25	3,834,297	1-Jan-23	1.00	15,550,205
PA 006	1,543	3-Oct-22	2022	4-Oct-22	0.24	3,247,687	1-Jan-23	1.00	13,319,168
	2,256	4-Oct-22	2022	5-Oct-22	0.24	4,695,048	1-Jan-23	1.00	19,473,780
	2,196	5-Oct-22	2022	6-Oct-22	0.24	4,518,246	1-Jan-23	1.00	18,955,860
	2,820	3-Nov-22	2022	4-Nov-22	0.16	3,868,080	1-Jan-23	1.00	24,342,224
	2,125	4-Nov-22	2022	5-Nov-22	0.16	2,864,521	1-Jan-23	1.00	18,342,988
	1,944	5-Nov-22	2022	6-Nov-22	0.15	2,574,557	1-Jan-23	1.00	16,780,597
PA 007	2,336	6-Nov-22	2022	7-Nov-22	0.15	3,038,462	1-Jan-23	1.00	20,164,339
	1,548	7-Apr-23	2023	-	-	-	8-Apr-23	0.73	9,622,190
	2,158	8-Apr-23	2023	-	-	-	9-Apr-23	0.73	13,363,828
	1,602	6-May-23	2023	-	-	-	7-May-23	0.65	8,880,319
	1,233	7-May-23	2023	-	-	-	8-May-23	0.65	6,806,255
	2,002	3-Jun-23	2023	-	-	-	4-Jun-23	0.58	9,797,487
PA 008	2,000	4-Jun-23	2023	-	-	-	5-Jun-23	0.58	9,741,312
	1,972	5-Jun-23	2023	-	-	-	6-Jun-23	0.57	9,559,196
	1,597	6-Dec-22	2022	7-Dec-22	0.07	914,406	1-Jan-2023	1.00	13,350,332
	1,500	7-Dec-22	2022	8-Dec-22	0.07	824,512	1-Jan-2023	1.00	12,539,447
	1,700	8-Dec-22	2022	9-Dec-22	0.06	895,511	1-Jan-2023	1.00	14,211,374
	1,596	9-Dec-22	2022	10-Dec-22	0.06	804,174	1-Jan-2023	1.00	13,341,972
	2,100	11-Jan-23	2023	-	-	-	12-Jan-23	0.97	17,026,165
	1,500	7-Feb-23	2023	-	-	-	8-Feb-23	0.90	11,233,971
	2,536	5-Feb-23	2023	-	-	-	6-Feb-23	0.90	19,109,064
PA 009	2,765	9-Feb-23	2023	-	-	-	10-Feb-23	0.89	20,581,298
	2,202	8-May-23	2023	-	-	-	9-May-23	0.65	11,952,532
	1,654	5-Apr-23	2023	-	-	-	6-Apr-23	0.74	10,579,480
	2,346	6-Apr-23	2023	-	-	-	7-Apr-23	0.74	14,950,143
	2,750	9-May-23	2023	-	-	-	10-May-23	0.65	15,374,810
	3,250	10-May-23	2023	-	-	-	11-May-23	0.64	18,093,238
	2,131	6-Jun-23	2023	-	-	-	7-Jun-23	0.57	10,500,545
PA 009	2,128	7-Jun-23	2023	-	-	-	8-Jun-23	0.57	10,435,350

	2,741	8-Jun-23	2023	-	-	-	9-Jun-23	0.56	13,376,464
	1,726	3-Jul-23	2023	-	-	-	4-Jul-23	0.50	7,400,898
	2,310	4-Jul-23	2023	-	-	-	5-Jul-23	0.49	9,850,302
	2,964	5-Jul-23	2023	-	-	-	6-Jul-23	0.49	12,568,872
PA 010	1,040	6-Oct-22	2022	7-Oct-22	0.24	2,007,034	1-Jan-23	1.00	8,518,224
	2,032	7-Oct-22	2022	8-Oct-22	0.23	3,875,837	1-Jan-23	1.00	16,643,299
	1,989	1-Nov-22	2022	2-Nov-22	0.16	2,677,990	1-Jan-23	1.00	16,291,103
	2,728	2-Nov-22	2022	3-Nov-22	0.16	3,611,763	1-Jan-23	1.00	22,343,957
	1,181	12-Dec-22	2022	13-Dec-22	0.05	503,531	1-Jan-23	1.00	9,673,099
	2,242	13-Dec-22	2022	14-Dec-22	0.05	905,589	1-Jan-23	1.00	18,363,325
Total						173,754,577			1,101,061,563

The baseline emissions are 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:

- SEC = 3574.8
- $f_i = 0.7044$
- $EF_{fossil\ fuel,i} = 85.7$
- $m = 1$

The following results for each project activity instance:

PAI	Vintage 1	Vintage 2
PA 001	18,420	43,161
PA 002	863	1,296
PA 003	340	16,608
PA 004	-	27,726
PA 005	7,165	24,440
PA 006	5,008	26,518
PA 007	-	13,534
PA 008	688	26,635
PA 009	-	24,864
PA 010	2,736	18,507
Total	35,220	223,289

5.2 Project Emissions

Refer to section 5.4 for the calculation of emission reductions resulting from the proposed project. There are no project emissions considered)

5.3 Leakage Emissions

Where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I.E version 13.0 explained below:

Leakage emissions (LE_y) related to the non – renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced. The following potential source of leakage shall be considered: the use/diversion of non-renewable woody biomass saved under the project activity by non-project end-users that previously used renewable energy source. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project end-users that

is attributable to the project activity, then BE_y is adjusted to account for the quantified leakage increase in the use of non-renewable woody biomass used by the non-project end-users that is attributable to the project activity, then BE_y is adjusted to account for the quantified leakage. BE_y will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. This is applied for the grouped project.

Hence $LE_y = BE_y \times (1-0.95)$

Details for each project activity instances are illustrated as following:

PAI	Vintage 1		Vintage 2	
	BE_y	LE_y	BE_y	LE_y
PA 001	18,420	919	43,161	2,160
PA 002	863	43	1,296	65
PA 003	340	17	16,608	831
PA 004	-	-	27,726	1,386
PA 005	7,165	358	24,440	1,221
PA 006	5,008	251	26,518	1,326
PA 007	-	-	13,534	676
PA 008	688	34	26,635	1,331
PA 009	-	-	24,864	1,243
PA 010	2,736	136	18,507	925
Total	35,220	1,758	223,289	11,164

5.4 GHG Emission Reductions and Carbon Dioxide Removals

The emission reduction by the grouped project activity will be calculated in accordance with equation 10, of the small-scale methodology AMS II.C., Version 15.0.

$$ER_y = (BE_y - PE_y) - LE_y$$

Where:

ER_y	Emission reductions in year y (tCO ₂ e)
BE_y	Baseline emission in year y (tCO ₂ e)
PE_y	Project emission in year y (tCO ₂ e)
LE_y	Leakage emission in year y (tCO ₂ e)

Net GHG Emission reductions achieved at project activity instance have been summarized:

PAI	Vintage 1			Vintage 2		
	BE _y	LE _y	RE _y	BE _y	LE _y	RE _y
PA 001	18,420	919	17,501	43,161	2,160	6,369
PA 002	863	43	820	1,296	65	6,725
PA 003	340	17	323	16,608	831	10,573
PA 004	-	-	-	27,726	1,386	5,183
PA 005	7,165	358	6,807	24,440	1,221	12,669
PA 006	5,008	251	4,757	26,518	1,326	5,265
PA 007	-	-	-	13,534	676	3,910
PA 008	688	34	654	26,635	1,331	5,676
PA 009	-	-	-	24,864	1,243	9,751
PA 010	2,736	136	2,600	18,507	925	3,197
Total	35,220	1,758	33,462	223,289	11,164	212,125

Net GHG emission reductions achieved under this grouped project are summarized below:

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Reduction VCU (tCO ₂ e)	Removal VCU (tCO ₂ e)	Total VCU (tCO ₂ e)
From 02-May-2022 to 31-Dec-2022	35,220	0	1,758	33,462	0	33,462
From 01-Jan-2023 to 31-Dec-2023	223,289	0	11,164	212,125	0	212,125
Total	258,509	0	12,922	245,587	0	245,587

Vintage period	Ex-ante estimated reductions/removals	Achieved reductions/removals	Percent difference	Explanation for the difference
PA001 From 02-May-2022 to 31-Dec-2022	28,831	17,501	-39.30%	- The number of WPs distributed in many months, not fully distributed on the first day of distribution - WP's distribution was still ongoing
PA 001 From 01-Jan-2023 to 31-Dec-2023	43,129	41,001	-4.93%	- The number of WP distributed in many months, not fully distributed on the first day of distribution
Total	71,960	58,502	-18.70%	

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Not Applicable.

APPENDIX 2: SUPPLY CHAIN (SCOPE 3)

Public statement has been posted on SIPCO's website:

<https://carbonvietnam.com/public-announcement-on-grouped-projects-for-cambodia-water-purifier-vcs-project-id-3052>

