



Verified Carbon Standard

GROUPED PROJECTS FOR WATER PURIFIERS FOR CLIMATE AND COMMUNITY ACTION

Document 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 intention of the grouped project activity (“hereafter “proposed project activity”) involves the installation of low greenhouse gas emitting safe drinking water purifier (SDWP) to provide clean drinking water to the households/communities/Small and Medium Enterprises (SMEs) (hereafter “users”) of Vietnam. For this reason, this proposed project activity aims at reducing the woodfuel consumption of traditional stove users by distributing water purifiers to households and/or SMEs.

The grouped project activity reduces the use and demand for fossil fuels and non-renewable biomass that would have been used to boil water as a means to purify water 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 rural communities with no previous water purifiers access. The geographical boundary is in Viet Nam. Water purifiers are distributed free of cost to users. 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 in three stone open fires to meet the boiling water demand.

The water purifiers (model Ecozen -25) covered under the project has been manufactured by Viet Charcoal Production Company Limited. The equipment lifetime is 10 years. The carbon credits shall be claimed only till the end of the operational life of the project devices.

Currently, there are 30 project instances under the grouped project¹. The first water purifier was distributed on 01 November 2021. The first monitoring period is from 01 November 2021 to 30 November 2022. Till the end of 1st monitoring period, a total of 282,089 water purifiers was reported installed under the project. Detail below:

Table 1: Distribution schedule

Month of installation	Number of Water Purifiers
11/2021	100
04/2022	2,150

¹ The detail of the 30 project instances is mentioned in the section 3.1

05/2022	7,750
06/2022	10,314
07/2022	19,913
08/2022	19,667
09/2022	40,084
10/2022	88,520
11/2022	93,591
Total	282,089

The total GHG emission reductions generated in the first monitoring from 01/11/2021 to 30/11/2022 is 95,318 tCO₂e GHG emission reductions.

Audit Type	Period	Program	VVB Name	Number of years
Validation	24/08/2021	VCS	Carbon Check (India) Private Ltd	
Verification	01/11/2021 - 30/11/2022	<u>VCS</u>	Carbon Check (India) Private Ltd	1.08
Total	<u>1</u>	<u>1</u>	<u>1</u>	1.08

1.2 Sectoral Scope and Project Type

The project activity under consideration is a grouped project activity. The project activity instances as part of the grouped project will have following sectoral scope, project type and methodologies:

Sectoral Scope applicable to project: 03 – Energy Demand

Project type III: Other projects activities not included in Type I or Type II that result in GHG emission reductions not exceeding 60,000 tCO₂e per year in any year of the crediting period

1.3 Project Proponent

Organization name	Sustainability Investment Promotion and Development Joint Stock Company. (SIPCO)
Contact person	Mr. Hoang Anh Dung
Title	Chairman
Address	5th Floor, Sunrise Building, No.25B3, 57 Lang Ha Street, Ba Dinh District, Hanoi, Viet Nam
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Email	dung.hoang@carbonvietnam.com

1.4 Other Entities Involved in the Project

Not Applicable

1.5 Project Start Date

The project start date is 01 November 2021 which is the distribution date of the first water purifier.

1.6 Project Crediting Period

The crediting period: From 01 November 2021 to 31 October 2031.

The first monitoring period: From 01 November 2021 to 30 November 2022 (both days included).

Total number of years: 10 years 00 month

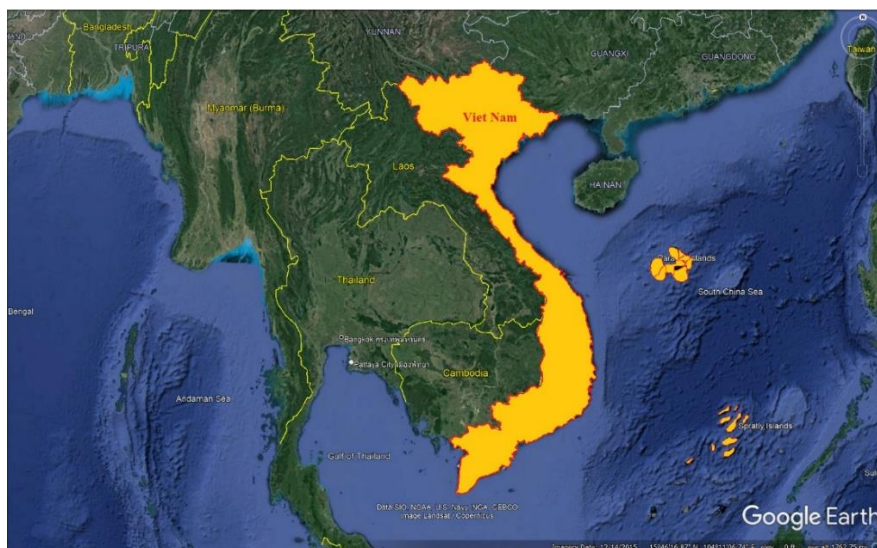
1.7 Project Location

The grouped project will be hosted by Viet Nam. The grouped project covers the 30 provinces of Tuyen Quang, Nam Dinh, Lai Chau, Dien Bien, Lao Cai, Son La, Quang Ninh, Bac Ninh, Ha Nam, Vinh Phuc, Quang Binh, Phu Yen, Dak Lak, Kon Tum, Lam Dong, Ha Tinh, Quang Tri, Gia Lai, Lang Son, Ha Giang, Hai Duong, Hung Yen, Thua Thien Hue, Quang Nam, Quang Ngai, Binh Thuan, Khanh Hoa, Ninh Thuan, Dak Nong and Bac Kan in Viet Nam bounded between.

Latitudes: 14.315425 N

Longitudes: 108.339537 E

The details of coordinates are being submitted separately as KML file.



Map 1: Map of grouped project

1.8 Title and Reference of Methodology

The methodology applied for this project is AMS-III.AV: “Low greenhouse gas- emitting safe drinking water production systems”, version 08.

This grouped project also refers to the approved versions of the following tools and methodologies:

- AMS-I.E.: “Switch from non-renewable biomass for thermal applications by the user”, version”. Version 12.0
- Standard for “Sampling and surveys for CDM project activities and programmes of activities”, version 09.0.
- CDM Guideline “Sampling and surveys of CDM project activities and programmes of activities” version 04.0.
- TOOL01 “Tool for the demonstration and assessment of additionality”, version 07.0.
- TOOL 21 - “Demonstration of additionality of small-scale project activities” (Version 13.1).
- TOOL30: Calculation of the fraction of non-renewable biomass, version 03.0.

1.9 Participation under other GHG Programs

The project is not registered under any other GHG Programs.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

- The project has not generated any other form of GHG emissions from trading program or any other mechanism.

- The project has not applied for any other programme to create another form of GHG related environment credit.
- SIPCO have sent the notification of the project and the potential risk of Scope 3 emission double claiming to Viet Charcoal Production Company Limited via email.
- Viet Charcoal Production Company Limited is in charge of manufacturing water purifiers for SIPCO's greenhouse gas emission reduction projects. The company received an email from SIPCO requesting a public statement for scope 3 emission of the project. However, Viet Charcoal's website is only used to introduce their products to partners, and does not publish information on their partners' projects to avoid misunderstanding. Therefore, all public statements for supply chain of scope 3 emission will be announced directly by the project proponents (SIPCO) on their websites instead in this crediting period. Content of statement below: "VCUs may be issued for the greenhouse gas emission reductions and removals associated with Ecozen-25 water purifiers, manufactured by Viet Charcoal Production Company Limited in Di Su commune, My Hao District, Hung Yen Province, Vietnam, distributed by Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) under their project activity titled "Grouped projects for water purifiers for climate and community action" (VCS ID: 2557). (detail in Appendix 1 of this report).

1.11 Sustainable Development Contributions

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

- ***Environmental sustainability***

The project will help significantly reduce greenhouse gas emissions over its lifetime.

The project will help reduce 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 will ensure the maintenance of watersheds that regulate water table levels and prevent flash flooding.

- ***Social benefits***

Purchasing or collecting firewood or fossil fuels to boil the water constitutes a significant expense for the very poorest households and communities. The project will provide access to clean drinking water, which will reduce the cost for families and thereby improve attendance at school, 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 will ensure continued SDWP.

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/fossil fuels.

The project will alleviate the work burden of women and children as they have to spend less time to collect firewood for boiling water.

- ***Economic benefits***

The project activity will help develop a section of Viet Nam rural economy through the installation and maintenance of SDWPs, as well as work related to monitoring of the carbon registration activity.

The proposed project will deliver a long term, secure and simple contribution to sustainable development in Viet Nam that would not exist without carbon finance.

The project aligns with and will contribute to sustainable development objectives outlined in Table 1 below.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
Sequential row number	SDG Target number	Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator	Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)	Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.	Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.
1)	1.4	1.4.1. Proportion of population living in households with access to basic services	Implemented activities to increase	Provide 282,089 families with greater access to basic services in the form of clean water technology	No further changes compare with this monitoring period

2)	3.3	By 2030, end the epidemics of AIDs, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water borne diseases and other communicable diseases.	Implemented activities to decrease	Provide safe water for 1,305,513 people, help to prevent illness related to digestive system such as diarrhea, cholera, dysentery, typhoid fever from drinking contaminated water is still a leading cause of death for children under five	No further changes compare with this monitoring period
	3.9	3.9.1: Mortality rate attributed to household and ambient air pollution	Implemented activities to decrease	Reduce HAP by 100% due to boil water by using 282,089 water purifiers in these households.	No further changes compare with this monitoring period
3)	5.4	5.4.1: Proportion of time spent on unpaid domestic and care work, by sex, age and location	Implemented activities to increase	No further changes this monitoring period	Under the project scenario, women will see a massive reduction in both the amount of fuelwood required for boil water, and the amount of time taken to boil water. They would be able to save 2 to 3 hours daily. They would also have time to engage in other employment opportunities.
4)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	Reduce the total fuelwood usage in the project area to generate approximately 95,318 tCO ₂ e of emission reductions	No further changes compare with this monitoring period

5)	6.1	Proportion of the rural population who have easy access to a safe water supply	Implemented activities to increase	With the distribution of 282,089 Safe Drinking Water Purifiers (SDWPs), the project will lower exposure to unsafe water for 282,089 households	No further changes compare with this monitoring period
6)	8.5	8.5.2:Unemployment rate, by sex, age and persons with disabilities.	Implemented activities to increase	The project have generated 40 employments opportunities for assembling of SPWPs, distribution of SPWPs and maintenance of SPWPs in this monitoring period	No further changes compare with this monitoring period
7)	15.1	15.2.1 Progress towards sustainable forest management.	Implemented activities to increase	By distributing 282,089 safe water purifiers, using drinking water directly instead of boiling water for drinking, the project help reduction in demand for firewood.	No further changes compare with this monitoring period

2 SAFEGUARDS

2.1 No Net Harm

Greenhouse gas reductions: Project implementation will result in GHG reductions because it will reduce the consumption of non-renewable biomass in countries where the biomass harvested for fuel use is typically non-renewable.

Air quality: Users (especially women and children) will be exposed to fewer air pollutants through reduced emission of not only CO₂, but also carbon monoxide and particulate matter.

Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory, cardiovascular and ocular diseases.

Biodiversity: will be improved as the programme reduces pressure on remaining forest reserves in Viet Nam. No negative impacts can be identified.

Water quality: Project implementation will help these households access to safe water. The filtered water meets the national standard of Viet Nam for drinking water.

2.2 Local Stakeholder Consultation

Local stakeholders were invited to a consultation meeting on 18/04/2021 at the head of office of Vietnam's Women Union in 39 Hang Chuoi, Pham Dinh Ho Street, Hai Ba Trung District, Ha Noi city, Viet Nam. Stakeholders were identified as those whose activities directly or indirectly impact the project, and those who were to be impacted by the project activities. Invitation letters were sent by SIPCO to the individual stakeholders. The invitations were welcoming written comments as well as physical attendance. The consultation was held for the Water purifier for climate and community action project. Many stakeholders attended the consultation meeting.

Mr. Hoang Anh Dung made a presentation on the social, economic and environmental impacts of the project activity to local communities. The project activity aims to distribute water purifier all over Vietnam and the pilot project activity of free distribution of 28,000 SDWPs to households who using traditional cookstove to boil water at Tuyen Quang Province. Mr Dung also briefly introduced of VCS projects. After the presentation and the questions and answer section made by the stakeholders

Continuing on the formal stakeholder consultations executed in current monitoring period, SIPCO has continued to expand its informal consultation activity to introduce the project at each province to reach households and stakeholders affected parties by project who did not access to formal meetings. Various relevant socio-economic and cultural barriers in the project area make them do not assess safe drinking water source at community.

Consequently, SIPCO has sought and continues to seek consultation from these groups through direct community engagement during the current monitoring period. Consultation activities have been undertaken on an informal basis, using participatory methods with previous, current, and prospective end user.

Consultation will continue throughout the project lifetime, and will continue to influence project design. Adaptations will be made if deemed necessary.

Currently, the project received all supportive comments from local stakeholders without any negative one.

Mechanism for ongoing communication

SIPCO engages with a number of stakeholders (Women's Union) through annual reports, records and SIPCO's social media communication. Women's Unions are large organizations at all administrative levels (Commune, District, Province, State).

Annual Reports includes information about the operation throughout the year. Women's Unions at commune and ward levels regularly come to exchange information with Beneficiaries and report to the District's level and the District's level will report it province's level. The province's Women Union has responsibly for summarizing and reporting to SIPCO. If these Beneficiaries have any comment in using water purifiers, the Women Union will report immediately to SIPCO.

Records will send to project donors about 2 times a year. The records include updates on current projects, community stories to share, fund raising appeals and much more.

Social media communications are crucial to stay engaged with a variety of stakeholders. Below mentioned mechanism will be used by stakeholders to communicate their grievances with the Project owner:

- Communication via phone call (+84) 243 519 0955 or email info@carbonvietnam.com
- By informing Women Union at levels.

SIPCO will continue to implement these informal ongoing consultation procedures, alongside formalized consultation via our annual survey.

During the first monitoring period, SIPCO has received some feedback form local stakeholders for the “Grouped projects for water purifiers for climate and community action” as below:

Representative of stakeholder	Feed back	Response by SIPCO
Household in Tuyen Quang Province	How often do we have to change the ceramic core?	SIPCO would recommend replacing the ceramic core

		every 2 years, depending on the quality of the incoming water of each household.
Women Union in Lang Son Province	Does SIPCO take water samples every year for testing to ensure water quality?	Annually, we will take random water sample to check quality. The result of testing will be inform to provincial Women Union
Household in Ha Tinh Province	Because I use a lot of water, can I buy another project water purifier?	The project's water filter is produced under the project activity, only distribute freely, not sold.

There were no negative or adverse comments received from stakeholders in this monitoring period

2.3.AFOLU-Specific Safeguards

This section is not applicable because the project is a non – AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

Table 02: Timeline of project activities (PAs)

Project activity	Steps	Timeline
PA 1	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	01/11/2021
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 100 WPs were distributed in Nov 2021 • 9,846 WPs were distributed in Aug 2022 • 4,044 WPs were distributed in Nov 2022.

PA 2	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	15/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	200 WPs were distributed in April 2022
PA 3	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	20/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in May 2022
PA 4	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	21/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in May 2022
PA 5	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	18/11/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	14,000 WPs were distributed in Nov 2022
PA 6	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	17/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in May 2022 13,900 WPs were distributed in Nov 2022
PA 7	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	05/07/2022

	Implementation status as on 30/11/2022 (number of SDWPs distributed)	300 WPs were distributed in July 2022 400 WPs were distributed in Aug 2022
PA 8	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	04/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	350 WPs were distributed in May 2022 4,414 WPs were distributed in July 2022 3,339 WPs were distributed in Aug 2022 7,897 WPs were distributed in Sep 2022
PA9	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	21/07/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in July 2022 8,900 WPs were distributed in Nov 2022
PA10	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	07/07/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	260 WPs were distributed in Jul 2022
PA11	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	05/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	350 WPs were distributed in Jun 2022 15,550 WPs were distributed in Oct 2022 3,000 WPs were distributed in Nov 2022
PA12	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	14/06/2022

	Implementation status as on 30/11/2022 (number of SDWPs distributed)	350 WPs were distributed in Jun 2022 11,650 WPs were distributed in Sep 2022
PA13	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	07/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	1,400 WPs were distributed in Apr 2022 100 WPs were distributed in May 2022 10,500 WPs were distributed in Oct 2022
PA14	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	09/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in May 2022 11,680 WPs were distributed in Oct 2022
PA15	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	09/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in May 2022 11,900 WPs were distributed in Oct 2022
PA16	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	18/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	250 WPs were distributed in Apr 2022 100 WPs were distributed in Jun 2022 11,800 WPs were distributed in Oct 2022
	Start date of first crediting period	01/11/2021

PA17	Project start date (the first equipment distributed)	22/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	100 WPs were distributed in Apr 2022
PA18	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	09/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	130 WPs were distributed in May 2022 8,580 WPs were distributed in Oct 2022
PA19	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	24/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	1,210 WPs were distributed in May 2022 72 WPs were distributed in Aug 2022 5,335 WPs were distributed in Oct 2022
PA20	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	12/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	210 WPs were distributed in May 2022 5,590 WPs were distributed in Oct 2022 8,800 WPs were distributed in Nov 2022
PA21	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	22/07/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	10,000 WPs were distributed in July 2022
PA22	Start date of first crediting period	01/11/2021

	Project start date (the first equipment distributed)	08/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 5,000 WPs were distributed in Jun 2022 • 4,000 WPs were distributed in Sep 2022
PA 23	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	23/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 200 WPs were distributed in Jun 2022 • 5,730 WPs were distributed in Sep 2022 • 4,070 WPs were distributed in Oct 2022 • 2,000 WPs were distributed in Nov 2022
PA 24	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	23/04/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 100 WPs were distributed in Apr 2022 • 270 WPs were distributed in Jun 2022 • 11,630 WPs were distributed in Nov 2022
PA 25	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	24/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 5,000 WPs were distributed in May 2022 • 6,000 WPs were distributed in Aug 2022
PA 26	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	24/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	• 1,054 WPs were distributed in Jun 2022 • 4,839 WPs were distributed in July 2022

		2,107 WPs were distributed in Oct 2022
PA 27	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	20/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	490 WPs were distributed in Jun 2022 11,510 WPs were distributed in Nov 2022
PA 28	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	22/06/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	2,500 WPs were distributed in Jun 2022 8,500 WPs were distributed in Sep 2022
PA 29	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	09/05/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	250 WPs were distributed in May 2022 8,850 WPs were distributed in Oct 2022 6,050 WPs were distributed in Nov 2022
PA 30	Start date of first crediting period	01/11/2021
	Project start date (the first equipment distributed)	21/09/2022
	Implementation status as on 30/11/2022 (number of SDWPs distributed)	200 WPs were distributed in Sep 2022 4,422 WPs were distributed in Nov 2022

3.2 Deviations

3.2.1 Methodology Deviations

Not applicable. No methodology deviations were applied.

3.2.2 Project Description Deviations

There has been a change in the sample size calculation for parameter m “fraction of functional appliances that are meeting the SDWP Standard” in section 5.3 of registered PD. The change is as described below:

Parameter m

As per Guideline “Sampling and surveys for CDM project activities and programmes of activities”, for the use of a single sampling plan covering a group of PAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/10 confidence/precision is applied for annual sampling. For fraction of functional appliances that are providing the SDWP (m), this is proportion value so the equation that will be used is:

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

Where:

- n : Sample size
- N=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

Substituting the values in above equation gives the value of N = [Number of users to be sampled] (rounded up).

At validation, the Implementer will distribute 28,000 SDWPs and will provide clean drinking water to Tuyen Quang households in Tuyen Quang Provinces. So, the population size, N is taken as 28,000 persons.

It is expected at least 90% of households will be use drinking water from SDWPs, hence the expected proportion p for N_{y,i,j} is taken as 0.9.

Based on the above assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated as:

$$n \geq \frac{1.96^2 \times 28,000 \times 0.9 (1-0.9)}{(28,000 -1) \times 0.1^2 \times 0.9^2 + 1.96^2 \times 0.9 (1- 0.9)}$$

Which comes out to be

$$n \geq 42.62$$

$$n = 43$$

Therefore, in this case a sample size of 43 is to be sampled from each primary sampling unit.

In case the resulting sample size to achieve the desired confidence/precision levels is smaller than 30, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. The sample size is 43.

3.3 Grouped Projects

New project activity instances included under this grouped project ensure that it meets the eligibility criteria below.

No.	Eligibility criterion - Category	How the new project activity instances to comply	Supporting evidence for inclusion
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 activities meet all applicability conditions listed in section 3.2 of the final PD.
2	Use the technologies or measures specified in the project description	The water purification technologies include a low greenhouse gas emitting technology	At the Monitoring time and for new project activities including PA02, PA03, PA04, PA05, PA06, PA07, PA08, PA09, PA10, PA11, PA12, PA13, PA14, PA15, PA16, PA17, PA18, PA19, PA20, PA21, PA22, PA23, PA24, PA25, PA26, PA27, PA28, PA29, PA30 no other project device type will be used, other than low greenhouse gas emitting technology.
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 this PD	The new project activities only apply the low greenhouse gas emitting technology in section 1.1

		Technologies for community water consumption, with project emissions 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 QCVN 6-1:2010/BYT for drinking water Lifespan is 10 years	
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area.	The grouped project will only perform distribution water purifiers within the 30 provinces of Viet Nam.	The new project activities have been implemented in the households of 30 provinces in Viet Nam
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”. Version 07.0. To demonstrate additionality by Simple cost analysis, each project instance shall confirm and demonstrate that the SDWPs are distributed for free to the Users.	The new project activities eligible when the CME have provided the confirmation that the SDWPs are distributed for free to the Users. Simple cost analysis has been provided for each project activity.

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 to the CME as part of the Carbon Rights Waiver within the Beneficiary agreement.	Each Users have been provided a safe drinking water purifier (SDWP) with a unique identification number put on each SDWP. Detail the labels are below: PA02: WP-002-00001 to WP-002-00200 PA03: WP-003-00001 to WP-003-00100 PA04: WP-004-00001 to WP-004-00100 PA05: WP-005-00001 to WP-005-14000 PA06: WP-006-00001 to WP-006-14000 PA07: WP-007-00001 to WP-007-00700 PA08: WP-008-00001 to WP-008-16000 PA09: WP-009-00001 to WP-009-09000 PA010: WP-010-00001 to WP-010-00260 PA011: WP-011-00001 to WP-011-18900 PA012: WP-012-00001 to WP-012-12000 PA013: WP-013-00001 to WP-013-12000 PA014: WP-014-00001 to WP-014-11780
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			PA015: WP-015-00001 to WP-12100 PA016: WP-016-00001 to WP-016-12150 PA017: WP-017-00001 to WP-017-00100 PA018: WP-018-00001 to WP-018-08710 PA019: WP-019-00001 to WP-019-06617 PA020: WP-020-00001 to WP-020-14600 PA021: WP-021-00001 to WP-021-10000 PA022: WP-022-00001 to WP-022-09000 PA023: WP-023-00001 to WP-023-12000 PA024: WP-024-00001 to WP-024-12000 PA025: WP-025-00001 to WP-025-11000 PA026: WP-026-00001 to WP-026-08000 PA027: WP-027-00001 to WP-027-12000 PA028: WP-028-00001 to WP-028-11000 PA029: WP-029-00001 to WP-029-15150 PA030: WP-030-00001 to WP-030-04622
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7	Capacity Limit	Each project instance will have a maximum capacity of 60,000tCO2e per year throughout the project instance crediting period.	The new project activities satisfy the criteria. The emission reduction of each Project activity is smaller than 60,000 tCO2/year. (Detail in ER sheet)
8	Target group	Each project instance will target end users which includes households who use traditional cookstove to boil water.	1. PPs have signed a distribution contract with the provincial Women's Union, this is an agency with all levels from central to local (village, hamlet), they are close the households and can know exactly these households who are using the traditional cookstove for cooking and boil water and they can select the correct beneficiaries. 2. Before starting the distribution of water purifiers at 30 provinces in whole of Viet Nam, PPs conduct a feasibility check through baseline survey, using random sample through which the proportion using traditional cookstove to boil water is being confirmed (details about the proportion using traditional cookstove to boil water are described in ER sheet) 3. Before receiving the water purifiers, each households in project activities must sign a beneficiary agreement to commit that they are using traditional cookstove to boil water. Therefore, the new project activities satisfy the criteria

Additionality

The proposed project activity instances are a voluntary coordinated action by SIPCO. There is no mandatory law or requirement in Viet Nam for the installation of water purification technologies/measures (SDWPs). Hence this voluntary coordinated action would not be possible in the absence of the grouped project, due to the cost associated with it.

The new project activity instances from PA 02 to PA 30 in grouped project will distribute SDWPs free of cost to users i.e. households, hence there is no financial return from the programme other than revenue from sale of GHG credits. As each SDWP has costs associated with the purchase and distribution of the SDWPs, these new project activity instances will not occur in absence of the GHG credits revenue. The action is not financially viable without the support of revenues from the sale of GHG credit. As the end-user doesn't benefit from a direct financial return and procuring SDWPs requires capital, which is a barrier to rural consumers due to difficulties in accessing capital, a wide dissemination of SDWPs in the Host Country is unlikely. The new project activity instances will alleviate these barriers by promoting free distribution of ICSs to end-users. Hence in line with para 10 a) of tool 21, version 13.1, the new project activity instances face investment barrier and its additional

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	PA	QPW _{pp}	
	PA 1	5.0	
	PA 2	4.98	
	PA 3	5.05	
	PA 4	5.04	
	PA 5	5.12	
	PA 6	5.02	
	PA 7	4.6	
	PA 8	4.82	
	PA 9	4.82	
	PA 10	5.12	
	PA 11	5.15	
	PA 12	5.04	
	PA 13	4.95	

	PA 14	4.88
	PA 15	5.15
	PA 16	4.95
	PA 17	4.99
	PA 18	5.06
	PA 19	5.12
	PA 20	5.10
	PA 21	5.05
	PA 22	4.98
	PA 23	5.02
	PA 24	5.12
	PA 25	4.88
	PA 26	4.45
	PA 27	4.85
	PA 28	5.05
	PA 29	5.13
	PA 30	5.08
Justification of choice of data or description of measurement methods and procedures applied	Survey	
Purpose of Data	Calculation of baseline emissions	
Comments	-	

Data / Parameter	LS
Data unit	Years
Description	Life span 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	Life span 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: (a) 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; (b) 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; (c) 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 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 the traditional cookstove to boil 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	PA	$BL_{fuel,i}$
	PA 1	0.9485
	PA 2	0.9638
	PA 3	0.9608

	PA 4	0.9819
	PA 5	0.976
	PA 6	0.985
	PA 7	0.9266
	PA 8	0.9459
	PA 9	0.9544
	PA 10	0.9548
	PA 11	0.9612
	PA 12	0.9669
	PA 13	0.9759
	PA 14	0.9578
	PA 15	0.9669
	PA 16	0.9789
	PA 17	0.9759
	PA 18	0.9726
	PA 19	0.9458
	PA 20	0.9674
	PA 21	0.9424
	PA 22	0.9392
	PA 23	0.9699
	PA 24	0.9518
	PA 25	0.9578
	PA 26	0.9634
	PA 27	0.9398
	PA 28	0.9459
	PA 29	0.9729
	PA 30	0.9666
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.
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Data / Parameter	<i>f_i</i>
Data unit	Fraction
Description	Factor to determine amount of non-renewable fuels
Source of data	Survey Methodology AMS – III.AV (Version 08.0),
Value applied	0.9403
Justification of choice of data or description of measurement methods and procedures applied	For the wood fuel, the value established from sub national survey report conducted for region in which specific instance(s) implemented and will be fixed ex-ante. The value will be established using as per the methodological Tool30 “Calculation of fraction of non-renewable biomass” version 03.0. As per “TOOL30: Calculation of the fraction of non-renewable biomass”. The analysis was independently completed by C4 Ecosolutions (Pty) Ltd. For fossil fuel, the default value is 1.0
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	EF _{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

Data / Parameter	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	PA	X _{boil}	
	PA 1	0.9909	
	PA 2	1	
	PA 3	1	
	PA 4	1	
	PA 5	1	
	PA 6	1	
	PA 7	1	
	PA 8	1	
	PA 9	1	
	PA 10	1	
	PA 11	1	
	PA 12	1	
	PA 13	1	
	PA 14	1	
	PA 15	1	
	PA 16	1	
	PA 17	1	
	PA 18	1	
	PA 19	1	
	PA 20	0.9970	
	PA 21	1	
	PA 22	1	
	PA 23	1	
	PA 24	1	
	PA 25	1	
	PA 26	1	
	PA 27	1	

		PA 28	1	
		PA 29	0.9969	
		PA 30	1	
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				

Data / Parameter	P_h		
Data unit	Fraction		
Description	Averaged number of person per household		
Source of data	Survey		
Value applied		PA	P_h
		PA 1	4.5
		PA 2	4.42
		PA 3	4.54
		PA 4	4.61
		PA 5	4.52
		PA 6	4.62
		PA 7	4.51
		PA 8	4.52
		PA 9	4.52
		PA 10	4.81
		PA 11	5.01
		PA 12	4.85
		PA 13	4.63
		PA 14	4.83
		PA 15	4.68
		PA 16	4.65
		PA 17	4.48
		PA 18	4.41
		PA 19	4.56

	PA 20	4.62
	PA 21	4.50
	PA 22	4.55
	PA 23	4.64
	PA 24	4.44
	PA 25	4.48
	PA 26	4.7
	PA 27	4.54
	PA 28	4.58
	PA 29	4.72
	PA 30	4.81
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	-	

4.2 Data and Parameters Monitored

Data / Parameter	Py			
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	PA	Ny	Ph	Py = Ny x Ph
	1	14,000	4.5	63,000
	2	200	4.42	884

	3	100	4.54	454
	4	100	4.61	461
	5	14,000	4.52	63,280
	6	14,000	4.62	64,680
	7	700	4.51	3,157
	8	16,000	4.52	72,320
	9	9,000	4.52	40,680
	10	260	4.81	1,251
	11	18,900	5.01	94,689
	12	12,000	4.85	58,200
	13	12,000	4.63	55,560
	14	11,780	4.83	56,897
	15	12,100	4.68	56,628
	16	12,150	4.65	56,498
	17	100	4.48	448
	18	8,710	4.41	38,411
	19	6,617	4.56	30,174
	20	14,600	4.62	67,452
	21	10,000	4.50	45,000
	22	9,000	4.55	40,950
	23	12,000	4.64	55,680
	24	12,000	4.44	53,280
	25	11,000	4.48	49,280
	26	8,000	4.7	37,600
	27	12,000	4.54	54,480
	28	11,000	4.58	50,380
	29	15,150	4.72	71,508
	30	4,622	4.81	22,232
	Total	282,089		1,305,513

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 08.0
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 person in a household. CME maintains the database of all water purifiers installed. 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 = Number of SDWPs n = Number of samples.
Comments	

Data / Parameter	QPW _y						
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: $QPW_y = P_y \times QPW_{pp} \times \text{Number of operating days}$						
Frequency of monitoring/recording	Annual						
Value monitored	<table> <tr> <th>PA</th><th>QPW_y</th></tr> <tr> <td>1</td><td>27,937,980</td></tr> <tr> <td>2</td><td>1,012,534</td></tr> </table>	PA	QPW _y	1	27,937,980	2	1,012,534
PA	QPW _y						
1	27,937,980						
2	1,012,534						

	3	447,077
	4	520,451
	5	1,295,974
	6	4,650,076
	7	1,898,259
	8	36,600,694
	9	3,779,940
	10	941,252
	11	16,496,189
	12	21,673,273
	13	19,900,134
	14	11,222,339
	15	11,318,299
	16	14,456,141
	17	498,521
	18	6,915,741
	19	6,457,625
	20	12,658,920
	21	29,088,000
	22	24,834,264
	23	13,975,680
	24	2,820,913
	25	35,395,226
	26	19,130,616
	27	2,276,324
	28	21,660,309
	29	12,322,301
	30	1,967,734
	Total	364,152,785

Monitoring equipment	-
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 certificate of Department on Environmental Quality Analysis Institute of Environmental Technology. The Laboratories has been assessed and found to conform with the requirements of international standards ISO/IEC 17025:2017 in accordance Certificate of Accreditation of Ministry of Science and Technology Bureau of Accreditation (BoA)
Description of measurement methods and procedures to be applied	For determination of function appliances that providing the SDW, an across PA sampling based on the WP model and its vintage with the applied 95/10 confidence precision level. Total of 43 samples were microbiological testing at Laboratory by third Party and all samples meet requirement following: (a) Using filtration ceramic with Natural Osmosis systems to create safe drinking water. (b) All SDWPs are operating in good condition. The use of appliances was monitored through self - report measures (survey questionnaires). We surveyed random samples all of physical signs that are observable (e.g. wetness of the unit, water in storage receptacle, functionality of parts). Through survey and physical signs, we can confirm that all SDWPs are operating in good). (c) All samples meet Microbiological parameters required by QCVN 6-1:2010/BYT for drinking water to deliver treated water verified to be <1cfu/100 ml E.Coli, using methods for measurement with a lower detection limit (LDL) of 1cfu E.Coli per 100 ml sample
Frequency of monitoring/recording	Annually

Value monitored	1
Monitoring equipment	
QA/QC procedures to be applied	Quality of safe drinking water is confirmed by Department on Environmental Quality Analysis Institute of Environmental Technology. This is the third party that conducted the test during monitoring period. The Laboratories have been recognized by VILAS in accordance with international standards ISO/IEC 17025: 2017. During the sampling plan, the people in charge are required to collect information and records of replacement of appliances, filters and maintenance if any. They will ask the sampled household if their WP has appliances, filter replaced & or have any maintenance activity and records in the sampling records. Later on, they will also cross-check the information with the record database using the serial number of the sampled WP to make sure of the accuracy of the information. However, during this monitoring period, all the sampled WP are in good condition, and there is no maintenance & replacement activity was recorded. Another, during WP usage, if the household detect any defective & abnormal issue with water quality, they will: - Notify SIPCO about defective SDWPs - SIPCO will send the appliance or filter cores to the Commune People's Committee and representative of Commune Women's Union will help replace the filter core for the households. - Households must sign the minutes of filter core replacement, and PPs will note in the data base for the next monitoring. The days from find defective filter core to replacement date will be note and CERs generate from this filter core in this time will be discarded in next monitoring period
Purpose of the data	Calculation of baseline emissions
Calculation method	
Comments	Emission reductions cannot be claimed if over 10% of appliances in the project activity fail to meet the final water quality requirements mentioned above.

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	Confirmation from local authorities and survey questionnaires
Description of measurement methods and procedures to be applied	1. Before distribution at new area, the provincial Women Union 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 DOE 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. (No public distribution network supplying SDWP is installed at project area)
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of the data	To check the applicability of methodology AMS.III.AV (Version 08)
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	Proportion
Description	The quality of the safe drinking water
Source of data	Water Quality testing certificates of Department on Environmental Quality Analysis Institute of Environmental Technology. The Laboratories has been assessed and found to conform with the requirements of international standards ISO/IEC 17025:2017

	in accordance Certificate of Accreditation of Ministry of Science and Technology Bureau of Accreditation (BoA)
Description of measurement methods and procedures to be applied	Quality of safe drinking water is confirmed by Third party annually. 09 samples for grouped project were sampled and tested. All treated water samples are confirmed to meet requirement of Viet Nam Drinking water Standard.
Frequency of monitoring/recording	Once every two years
Value monitored	1
Monitoring equipment	-
QA/QC procedures to be applied	
Purpose of the 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).

Due to the large number of SDWP distributed as part of the PAs included in the grouped project, it is not economically feasible to monitor each individual SDWP unit distributed. Therefore, representative sampling was undertaken as part of a grouped project - wide Sampling Plan (by grouping and sampling across PAs) that is designed in line with the requirements of the “Sampling and surveys for CDM project activities and programme of activities”, version 04

(a) Objective and reliability requirements

As a rule, the most appropriate confidence/precision levels required by the methodology AMS-III.AV (Version 09.0) and the Sampling Standard will be applied whenever sampling is undertaken. According to the Sampling Standard, 95/10 reliability is to be applied whenever sampling across a group of instance, which will typically be the case for this grouped project. In the case of conducting instance-specific sampling, the methodology AMS-III.AV (Version

09.0) 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 will be to meet the monitoring requirements set forth in the methodologies AMS-III.AV (Version 09.0). Monitoring will be 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. CME has considered 95/10 confidence/precision sampling to consider 30 PAs under one sampling frame. This will be applicable to instance types as long as homogeneity can be demonstrated. When homogeneity cannot be demonstrated the CME may monitor instances individually. All monitoring shall be coordinated by the CME.

Sampled parameters.

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
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 year

(b) Target population

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

(c) Sampling method

Sampling will be 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.

To determine the parameters, sampling survey has been involved the following approaches (outcome in brackets):

Py: Visual inspection of the premises to see if SDWP is operational and in use. Interview with end user if required to verify that SDWP is still in use (Yes/No).

m, water quality: These are monitoring parameters and testing has also been performed by third party.

Using the formulas as given in the section “Sample Size” below, the CME has randomly sampled the required number of SDWPs from the primary sampling units.

(d) Sample size

The sample size will be 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.

Parameter Py

For population who consumes the purified water serviced by the project activity in year y (Py), the equation that will be used is:

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

Where:

n : Sample size
N=Ny : 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 assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated for total population size, the result below:

Monitoring parameter(s)	Water purifier Operating Fraction for determination of P_y			
Sampling frame(s)	Given stove model and age population			
Sampling approach	Stratified random sampling across stove model and age			
Sampling Population (Batch)	Water Purifier population	Expected operational proportion)	Calculated Sample Size (n)	Actual Monitored sample size
Ecozen age 1	100	0.90	0	1
Ecozen age 2	281,989	0.90	43	53
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 CME 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 (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter. 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.

Parameter m

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

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

Where:

- n : Sample size
N=Ny : 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 assumptions, the resulting sampling size for a 95/10 confidence/precision is calculated for total population size, the result below:

A total sample size for parameter m is 43 samples.

Monitoring parameter(s)	Function fraction (m)		
Sampling frame(s)	Given stove model and age population		
Sampling approach	Stratified random sampling across stove model and age		
Sampling Population (Batch)	Water Purifier population	Expected operational proportion)	Calculated Sample Size (n)
Ecozen age 1	100	0.90	0
Ecozen age 2	281,989	0.90	43
Sample size determination			
Estimated Operation (p)			0.90
Voperation= p(1-p)/p2			0.111
Sample Size required (SOF)			43

Since parameters Py and m share the same sampling units, CME may choose to have one common survey for these two para meters. Other hand, to save cost for testing parameter m, we will choose 43 samples available for parameter m from 54 samples of parameter Py.

Quality of safe drinking water

Water quality monitoring will be undertaken annually or biennially on a sampling basis. This will comply with relevant national standards. 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 shall be 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 shall be used. The fraction of water quality measurements providing water of insufficient quality shall be excluded from the calculation of emission reductions.

For water quality, the equation that will be used is:

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

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

Where:

n : Sample size

N=Ny : 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

$$n \geq \frac{1.96^2 \times 282,089 \times (0.09/0.9)^2}{(282,089 - 1) \times 0.1^2 + 1.96^2 \times (0.09/0.9)}$$

Using above values, the sample size comes out to be 3.84 or 4

As the calculated sample size (for parameter of interest is a numeric mean value) is less than 30 samples, the Student’s t-distribution will be 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))

Monitoring Parameter	Functional appliances (m)					
Sampling approach	Stratified random sampling based on stove year of distribution					
Year	Year of operation	Population Size	Expected Mean	Expected Standard Deviation	Calculated Sample Size	Actual Monitored sample size
2	2	100	0.9000	0.135	1	1
1	1	281,989	0.9000	0.090	6	8
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	
tDistribution 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. We expect the response rate from the sampled households to be 80%. Thus, we would decide to sample $7/0.8 = 9$ samples.

(e) Analysis of data collected and confidence/precision achieved

Analysis of the data monitored through sampling revealed the following results

Parameters P_y

RESULT			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored Operation
Ecozen- 25	282,089	54	1.00

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

Parameters m

RESULT			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored water quality fraction
Ecozen- 25	282,089	43	1.00
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

Parameter water quality

RESULT			
Sampling Population	Sampling frame size	Monitored Sample Size	Monitored standard deviation
Ecozen- 25	282,089	9	1.00
Reliability Check			
Samples Monitored			9
Water quality			1.00
Standard Error of water quality			0.00%
Relative precision (Margin of error)			0.00%

Result	Ok, reliability level met
Lower Bound confidence value	Not applicable

For detailed calculations refer ER calculator sheet.

(f) Implementation plan

Survey Implementation Schedule:

The survey for collecting the details of monitoring parameters will be conducted at least annually and will be scheduled during the last month of the crediting monitoring period.

The overall monitoring and the implementation of the sampling will be co-ordinated by the project proponent and the management staff. They will ensure successful monitoring of the emission reductions of the proposed project during its crediting period. Furthermore, the survey of the representative sample for the parameters will be carried out by the distributor together with the project proponent.

The survey method has been used by project proponent include:

(a) Hard-copy questionnaires

(b) Face to face interview

All sampling efforts will be conducted by qualified personnel who have undergone training as part of the grouped project. Any samplers will be required to speak the native language(s) in which water purification systems have been implemented, allowing for full understanding of any responses given by users, and any questions therein.

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
$EF_{projected\ fossil\ fuel,i}$	: Emission factor of the fossil fuel substituted (tCO ₂ /TJ).

SIPCO coordinated with the Women's Unions of the provinces to conduct baseline surveys for each new area (project instance). 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 90% to determine the parameter Q_{PWpp} X_{boil} , $BL_{fuel,i}$ and P_n . Applying the simple random sampling technical, the household numbers are randomly chosen from the required sample size as calculated by the CME. 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 PA as following as.

Project activity	Population	Calculated sample size	Actual sample size
PA 1	28,000	269	330
PA 2	12,000	265	332
PA 3	12,000	265	332
PA 4	11,000	265	332

PA 5	14,000	266	333
PA 6	14,000	266	333
PA 7	7,000	261	327
PA 8	16,000	267	333
PA 9	9,000	263	329
PA 10	12,000	265	332
PA 11	18,900	268	335
PA 12	12,000	265	332
PA 13	12,000	265	332
PA 14	11,780	265	332
PA 15	12,100	265	332
PA 16	12,150	265	332
PA 17	12,100	265	332
PA 18	8,710	263	329
PA 19	12,000	265	332
PA 20	19,110	269	337
PA 21	10,000	264	330
PA 22	9,000	264	329
PA 23	12,000	265	332
PA 24	12,000	265	332
PA 25	11,000	265	332
PA 26	8,000	262	328
PA 27	12,000	265	332
PA 28	11,000	265	332
PA 29	15,150	266	332
PA 30	12,000	263	329

In this monitoring period, the grouped project has distributed 282,089 water purifiers for households in 30 provinces in Viet Nam. According to the results of a random survey of households in each project activity, the result the parameter QW_{pp}, X_{boil} , $BL_{fuel,i}$ and P_h for each project activity instance as following:

Project activity	P_h	QW _{pp}	X_{boil}	$BL_{fuel,i}$
PA 1	4.5	5.0	0.9909	0.9485
PA 2	4.2	4.98	1	0.9638
PA 3	4.54	5.05	1	0.9608
PA 4	4.61	5.04	1	0.9819
PA 5	4.52	5.12	1	0.976
PA 6	4.62	5.02	1	0.985
PA 7	4.51	4.6	1	0.9266
PA 8	4.52	4.82	1	0.9459
PA 9	4.52	4.82	1	0.9544
PA 10	4.81	5.12	1	0.9548
PA 11	5.01	5.15	1	0.9612
PA 12	4.85	5.04	1	0.9669
PA 13	4.63	4.95	1	0.9759
PA 14	4.83	4.88	1	0.9578
PA 15	4.68	5.15	1	0.9669
PA 16	4.65	4.95	1	0.9789
PA 17	4.48	4.99	1	0.9759
PA 18	4.41	5.06	1	0.9726
PA 19	4.56	5.12	1	0.9458
PA 20	4.62	5.10	0.9970	0.9674
PA 21	4.5	5.05	1	0.9424

PA 22	4.55	4.98	1	0.9392
PA 23	4.64	5.02	1	0.9699
PA 24	4.44	5.12	1	0.9518
PA 25	4.48	4.88	1	0.9578
PA 26	4.70	4.45	1	0.9634
PA 27	4.54	4.85	1	0.9398
PA 28	4.58	5.05	1	0.9459
PA 29	4.75	5.13	0.9969	0.9729
PA 30	4.84	5.08	1	0.9666

These value is less than the maximum quality of drinking water person per day of 5.5l/person/day. So, the quantity of purified water in year is

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

Result for each PA depend on number of distributed water purifiers and proportion activity days in a year, detail below:

Name of CPA	Quantity	Start date of distribution water purifier in a month	End date of distribution water purifier in a month	Start date of WP crediting (considering the start date of monitoring period)	End date of WP crediting (considering the end date of monitoring period)	Equivalent Operational year in the monitoring period	QPW _y
PA 1	100	1-Nov-21	1-Nov-22	1-Nov-21	31-Dec-21	0.17	137,250
				1-Jan-22	30-Nov-22	0.92	751,500
PA 1	9,856	5-Aug-22	8-Aug-22	8-Aug-22	30-Nov-22	0.32	25,502,400
PA 1	4,044	10-Nov-22	14-Nov-22	14-Nov-22	30-Nov-22	0.05	1,546,830
PA 2	200	15-Apr-22	15-Apr-22	15-Apr-22	30-Nov-22	0.63	1,012,534
PA 3	100	20-May-22	20-May-22	20-May-22	30-Nov-22	0.53	447,077
PA 4	100	21-Apr-22	21-Apr-22	21-Apr-22	30-Nov-22	0.61	520,451
PA 5	14,000	18-Nov-22	27-Nov-22	27-Nov-22	30-Nov-22	0.01	1,295,974

PA 6	100	17-May-22	17-May-22	17-May-22	30-Nov-22	0.54	459,210
PA 6	13,900	14-Nov-22	18-Nov-22	18-Nov-22	30-Nov-22	0.04	4,190,867
PA 7	300	5-Jul-22	5-Jul-22	5-Jul-22	30-Nov-22	0.41	927,346
PA 7	400	6-Aug-22	6-Aug-22	6-Aug-22	30-Nov-22	0.32	970,913
PA 8	350	4-May-22	4-May-22	4-May-22	30-Nov-22	0.58	1,608,926
PA 8	4,414	6-Jul-22	8-Jul-22	8-Jul-22	30-Nov-22	0.40	14,040,115
PA 8	3,339	10-Aug-22	10-Aug-22	10-Aug-22	30-Nov-22	0.31	8,220,161
PA 8	7,897	15-Sep-22	18-Sep-22	18-Sep-22	30-Nov-22	0.20	12,731,493
PA 9	100	21-Jul-22	21-Jul-22	21-Jul-22	30-Nov-22	0.36	289,759
PA 9	8,900	10-Nov-22	13-Nov-22	13-Nov-22	30-Nov-22	0.05	3,490,181
PA 10	260	7-Jul-22	7-Jul-22	7-Jul-22	30-Nov-22	0.40	941,252
PA 11	350	5-Jun-22	5-Jun-22	5-Jun-22	30-Nov-22	0.49	1,616,464
PA 11	15,550	7-Oct-22	28-Oct-22	28-Oct-22	30-Nov-22	0.09	13,641,253
PA 11	3,000	12-Nov-22	15-Nov-22	15-Nov-22	30-Nov-22	0.04	1,238,472
PA 12	350	14-Jun-22	14-Jun-22	14-Jun-22	30-Nov-22	0.47	1,454,418
PA 12	11,650	10-Sep-22	21-Sep-22	21-Sep-22	30-Nov-22	0.19	20,218,855
PA 13	1,400	7-Apr-22	7-Apr-22	7-Apr-22	30-Nov-22	0.65	7,636,444
PA 13	100	9-May-22	9-May-22	9-May-22	30-Nov-22	0.56	472,121
PA 13	10,500	3-Oct-22	13-Oct-22	13-Oct-22	30-Nov-22	0.13	11,791,568
PA 14	100	9-May-22	9-May-22	9-May-22	30-Nov-22	0.56	485,550
PA 14	11,680	14-Oct-22	23-Oct-22	23-Oct-22	30-Nov-22	0.11	10,736,789
PA 15	200	9-May-22	9-May-22	9-May-22	30-Nov-22	0.56	993,002
PA 15	11,900	21-Oct-22	26-Oct-22	26-Oct-22	30-Nov-22	0.10	10,325,297

PA 16	250	18-Apr-22	18-Apr-22	18-Apr-22	30-Nov-22	0.62	1,306,243
PA 16	100	17-Jun-22	17-Jun-22	17-Jun-22	30-Nov-22	0.46	384,392
PA 16	11,800	1-Oct-22	15-Oct-22	15-Oct-22	30-Nov-22	0.13	12,765,506
PA 17	100	22-Apr-22	22-Apr-22	22-Apr-22	30-Nov-22	0.61	498,521
PA 18	130	9-May-22	9-May-22	9-May-22	30-Nov-22	0.56	597,585
PA 18	8,580	22-Oct-22	29-Oct-22	29-Oct-22	30-Nov-22	0.09	6,318,156
PA 19	1,210	24-May-22	24-May-22	24-May-22	30-Nov-22	0.52	5,395,771
PA 19	72	10-Aug-22	10-Aug-22	10-Aug-22	30-Nov-22	0.31	189,953
PA 19	5,335	21-Nov-22	24-Nov-22	24-Nov-22	30-Nov-22	0.02	871,901
PA 20	210	12-May-22	12-May-22	12-May-22	30-Nov-22	0.56	1,004,448
PA 20	5,590	2-Oct-22	5-Oct-22	5-Oct-22	30-Nov-22	0.16	7,507,560
PA 20	8,800	8-Nov-22	11-Nov-22	11-Nov-22	30-Nov-22	0.05	4,146,912
PA 21	10,000	22-Jul-22	26-Jul-22	26-Jul-22	30-Nov-22	0.35	29,088,000
PA 22	5,000	8-Jun-22	20-Jun-22	20-Jun-22	30-Nov-22	0.45	18,580,380
PA 22	4,000	20-Sep-22	23-Sep-22	23-Sep-22	30-Nov-22	0.19	6,253,884
PA 23	200	23-Jun-22	23-Jun-22	23-Jun-22	30-Nov-22	0.44	750,028
PA 23	5,730	24-Sep-22	28-Sep-22	28-Sep-22	30-Nov-22	0.18	8,541,936
PA 23	4,070	13-Oct-22	18-Oct-22	18-Oct-22	30-Nov-22	0.12	4,171,275
PA 23	2,000	15-Nov-22	20-Nov-22	20-Nov-22	30-Nov-22	0.03	512,442
PA 24	100	23-Apr-22	23-Apr-22	23-Apr-22	30-Nov-22	0.61	504,668
PA 24	270	22-Jun-22	22-Jun-22	22-Jun-22	30-Nov-22	0.44	994,333
PA 24	11,630	23-Nov-22	26-Nov-22	26-Nov-22	30-Nov-22	0.01	1,321,912
PA 25	5,000	24-May-22	28-May-22	28-May-22	30-Nov-22	0.51	20,441,344

PA 25	6,000	7-Aug-22	9-Aug-22	9-Aug-22	30-Nov-22	0.31	14,953,882
PA 26	1,054	24-Jun-22	24-Jun-22	24-Jun-22	30-Nov-22	0.44	3,527,106
PA 26	4,839	29-Jul-22	29-Jul-22	29-Jul-22	30-Nov-22	0.34	12,650,961
PA 26	2,107	25-Sep-22	25-Sep-22	25-Sep-22	30-Nov-22	0.18	2,952,550
PA 27	490	20-Jun-22	20-Jun-22	20-Jun-22	30-Nov-22	0.45	1,769,447
PA 27	11,510	27-Nov-22	29-Nov-22	29-Nov-22	30-Nov-22	0.01	506,877
PA 28	2,500	22-Jun-22	27-Jun-22	27-Jun-22	30-Nov-22	0.43	9,078,133
PA 28	8,500	26-Sep-22	28-Sep-22	28-Sep-22	30-Nov-22	0.18	12,582,176
PA 29	250	9-May-22	9-May-22	9-May-22	30-Nov-22	0.56	1,247,000
PA 29	8,850	4-Oct-22	11-Oct-22	11-Oct-22	30-Nov-22	0.14	10,928,808
PA 29	6,050	29-Nov-22	30-Nov-22	30-Nov-22	30-Nov-22	0.00	146,492
PA 30	200	21-Sep-22	21-Sep-22	21-Sep-22	30-Nov-22	0.19	346,974
PA 30	4,422	13-Nov-22	16-Nov-22	16-Nov-22	30-Nov-22	0.04	1,620,760

The baseline emissions shall be calculated as follows:

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

Result as following:

PA	QPW _y	m	X _{Boil}	BL _{fuel,i}	SEC	f _i	EF _{fossil fuel,i}	BE _y
PA 1	137,250	1	0.9909	0.9485	3574.8	0.9403	85.7	37
	27,800,730	1	0.9909	0.9485	3574.8	0.9403	85.7	7,527
PA 2	1,012,534	1	1	0.9638	3574.8	0.9403	85.7	281
PA 3	447,077	1	1	0.9608	3574.8	0.9403	85.7	124
PA 4	520,451	1	1	0.9819	3574.8	0.9403	85.7	147
PA 5	1,295,974	1	1	0.976	3574.8	0.9403	85.7	364

PA 6	4,650,076	1	1	0.985	3574.8	0.9403	85.7	1,319
PA 7	1,898,259	1	1	0.9266	3574.8	0.9403	85.7	506
PA 8	36,600,694	1	1	0.9459	3574.8	0.9403	85.7	9,973
PA 9	3,779,940	1	1	0.9544	3574.8	0.9403	85.7	1,039
PA 10	941,252	1	1	0.9548	3574.8	0.9403	85.7	259
PA 11	16,496,189	1	1	0.9612	3574.8	0.9403	85.7	4,568
PA 12	21,673,273	1	1	0.9669	3574.8	0.9403	85.7	6,037
PA 13	19,900,134	1	1	0.9759	3574.8	0.9403	85.7	5,594
PA 14	11,222,339	1	1	0.9578	3574.8	0.9403	85.7	3,096
PA 15	11,318,299	1	1	0.9669	3574.8	0.9403	85.7	3,153
PA 16	14,456,141	1	1	0.9789	3574.8	0.9403	85.7	4,077
PA 17	498,521	1	1	0.9759	3574.8	0.9403	85.7	140
PA 18	6,915,741	1	1	0.9726	3574.8	0.9403	85.7	1,938
PA 19	6,457,625	1	1	0.9458	3574.8	0.9403	85.7	1,759
PA 20	12,658,920	1	0.9970	0.9674	3574.8	0.9403	85.7	3,517
PA 21	29,088,000	1	1	0.9424	3574.8	0.9403	85.7	7,897
PA 22	24,834,264	1	1	0.9392	3574.8	0.9403	85.7	6,719
PA 23	13,975,680	1	1	0.9699	3574.8	0.9403	85.7	3,905
PA 24	2,820,913	1	1	0.9518	3574.8	0.9403	85.7	773
PA 25	35,395,226	1	1	0.9578	3574.8	0.9403	85.7	9,766
PA 26	19,130,616	1	1	0.9634	3574.8	0.9403	85.7	5,309
PA 27	2,276,324	1	1	0.9398	3574.8	0.9403	85.7	616

PA 28	21,660,309	1	1	0.9459	3574.8	0.9403	85.7	5,902
PA 29	12,322,301	1	0.9969	0.9729	3574.8	0.9403	85.7	3,443
PA 30	1,967,734	1	1	0.9666	3574.8	0.9403	85.7	548

5.2 Project Emissions

The operation of the project water purifier does not involve consumption of fossil fuels and electricity. So, there is no project emissions considered.

5.3 Leakage

Where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I. E version 12.0 explained below:

Leakage emissions 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 B_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 B_y is adjusted to account for the quantified leakage. B_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.

So $LE_y = B_y \times (1-0.95)$.

Detail below:

PA	Year	BE_y	LE_y
PA 1	2021	37	2
	2022	7527	376
PA 2	2022	281	14
PA 3	2022	124	6
PA 4	2022	147	7

PA 5	2022	364	18
PA 6	2022	1,319	66
PA 7	2022	506	25
PA 8	2022	9,973	499
PA 9	2022	1,039	52
PA 10	2022	259	13
PA 11	2022	4,568	228
PA 12	2022	6,037	302
PA 13	2022	5,594	280
PA 14	2022	3,096	155
PA 15	2022	3,153	158
PA 16	2022	4,077	204
PA 17	2022	140	7
PA 18	2022	1,938	97
PA 19	2022	1,759	88
PA 20	2022	3,517	176
PA 21	2022	7,897	395
PA 22	2022	6,719	336
PA 23	2022	3,905	195
PA 24	2022	773	39
PA 25	2022	9,766	488
PA 26	2022	5,309	265
PA 27	2022	616	31
PA 28	2022	5,902	295

PA 29	2022	3,443	172
PA 30	2022	548	27

5.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

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

BE_y : Baseline emissions in year y (t CO₂e/yr)

PE_y : Project emissions in year y (t CO₂e/yr)

LE_y : Leakage emissions in year y (t CO₂e/yr)

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2021 (From 01/11/2021-31/12/2021)	37	0	2	35
2022 (From 01/01/2022 to 30/11/2022)	100,296	0	5,013	95,283
Total	100,333	0	5,015	95,318

For detail emission reduction of each project activity below:

PA	Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
PA 1	2021 (01/11/2021 - 31/12/2021)	37	0	2	35
	2022 (01/01/2022 - 30/11/2022)	7527	0	376	7151
PA 2	2022 (15/04/2022 - 30/11/2022)	281	0	14	267
PA 3	2022 (20/05/2022 - 30/11/2022)	124	0	6	118
PA 4	2022 (21/04/2022 - 30/11/2022)	147	0	7	140
PA 5	2022 (18/11/2022 - 30/11/2022)	364	0	18	346
PA 6	2022 (17/05/2022 - 30/11/2022)	1,319	0	66	1,253
PA 7	2022 (05/07/2022 - 30/11/2022)	506	0	25	481
PA 8	2022 (04/05/2022 - 30/11/2022)	9,973	0	499	9,475
PA 9	2022 (21/07/2022 - 30/11/2022)	1,039	0	52	987
PA 10	2022 (07/07/2022 - 30/11/2022)	259	0	13	246
PA 11	2022 (05/06/2022 - 30/11/2022)	4,568	0	228	4,339
PA 12	2022 (14/06/2022 - 30/11/2022)	6,037	0	302	5,735
PA 13	2022 (07/04/2022 - 30/11/2022)	5,594	0	280	5,315
PA 14	2022 (09/05/2022 - 30/11/2022)	3,096	0	155	2,942
PA 15	2022 (09/05/2022 - 30/11/2022)	3,153	0	158	2,995
PA 16	2022 (18/04/2022 - 30/11/2022)	4,077	0	204	3,873

PA 17	2022 (22/04/2022 - 30/11/2022)	140	0	7	133
PA 18	2022 (09/05/2022 - 30/11/2022)	1,938	0	97	1,841
PA 19	2022 (24/05/2022 - 30/11/2022)	1,759	0	88	1,671
PA 20	2022 (12/05/2022 - 30/11/2022)	3,517	0	176	3,341
PA 21	2022 (22/07/2022 - 30/11/2022)	7,897	0	395	7,502
PA 22	2022 (08/06/2022 - 30/11/2022)	6,719	0	336	6,383
PA 23	2022 (23/06/2022 - 30/11/2022)	3,905	0	195	3,710
PA 24	2022 (23/04/2022 - 30/11/2022)	773	0	39	735
PA 25	2022 (24/05/2022 - 30/11/2022)	9,766	0	488	9,278
PA 26	2022 (24/06/2022 - 30/11/2022)	5,309	0	265	5,044
PA 27	2022 (20/06/2022 - 30/11/2022)	616	0	31	585
PA 28	2022 (22/06/2022 - 30/11/2022)	5,902	0	295	5,607
PA 29	2022 (09/05/2022 - 30/11/2022)	3,443	0	172	3,271
PA 30	2022 (21/09/2022 - 30/11/2022)	548	0	27	521
Total		100,333	0	5,015	95,318

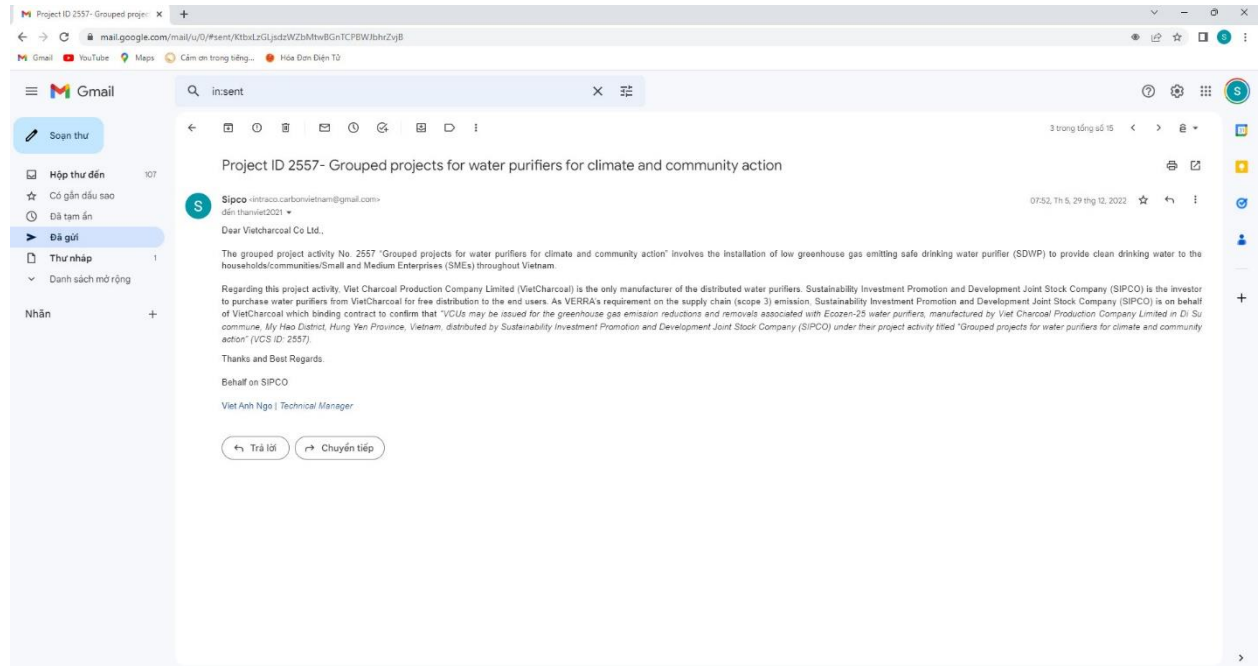
For detailed calculations refer ER calculation sheet.

PA	<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
PA 1	64,014	7,186	88.77%	- The number of water purifiers distributed in many months, not fully distributed on the first day of distribution.

				- Water purifier's distribution is still ongoing
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APPENDIX 1: SUPPLY CHAIN

1. Email SIPCO sent to Viet Charcoal about supply chain scope 3



2. Public statement has been posted on SIPCO's website.

<https://intracocarbon.com/public-announcement-on-grouped-projects-for-water-purifiers-for-climate-and-community-action-project-id-2557>

