



Verified Carbon Standard

GROUPED PROJECTS FOR MEKONG RIVER DELTA WATER PURIFIER

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 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 Viet Nam. For this reason, this proposed project activity aims at reducing the wood fuel 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 estimates of annual average and total GHG emission reductions for the chosen crediting period are 1,202,693 tCO₂e/annum

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

1.3 Project Eligibility

Project activity involves water purifiers distribution which falls under the category of efficiency improvements in thermal applications and reduces the use and demand of fossil fuel and non-renewable biomass that would have been used to boil the water. The baseline & monitoring methodology applied for this project is AMS-III.AV: “Low greenhouse gas-emitting safe drinking water production systems”, version 08. The host country of the project is Viet Nam. Therefore, project activity does not fall under the excluded list of projects as prescribed under the table 1 of section 2.1.1. of the VCS Standard version 04.

Also, the project eligibility can be referred from the requirements of the section 3.5.15 of the VCS standard, v4.0. The key criteria are as follows:

1) *Meet the applicability conditions set out in the methodology applied to the project.*

Any project activity instance shall demonstrate that the applicability criteria of approved methodology AMS-III.AV. (Version 08.0) are met.

- Only low greenhouse gas emitting water purifiers will be distributed to households;
- Proof that a public distribution network supplying SDWP does not exist in the project boundary;
- The drinking water supply households use various water treatment filters according to the water quality of water sources to meet the national standard or guideline of Viet Nam
- If the lifespan of the equipment is shorter than the crediting period, equipment shall be replaced at the end of its lifespan free of charge for Users.
- Each SDWP shall confirm to the technology standards as per paragraph 4(b) of approved methodology AMS-III.AV (Version 08).
- The use of this methodology in a project of activity under a grouped project is legitimate if the leakage is estimated and accounted for as per the relevant provisions of AMS-I.E under the section for grouped project. Use the technologies or measures specified in the project description.

2) *Use the technologies or measures specified in the project description*

The water purification technologies include a low greenhouse gas emitting technology as per section 1.11 of this PD

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
- 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 project boundary corresponds to the boundaries of the Host Country Viet Nam. All installed SDWP in each instance shall be located within geographical boundary of Viet Nam.

5) *Have characteristics with respect to additionally that are consistent with the initial instances for the specified project activity and geographic area. For example, the new project activity instances have financial, technical and/or other parameters (such as the size/scale of the instances) consistent with the initial instances, or face the same investment, technological and/or other barriers as the initial instances.*

The additionally of the project activity is demonstrated by simple cost analysis that is in line with paragraph 10 (a) of Tool21 “Demonstration of additionally of small-scale project activities” (version 12) and paragraph 33 and 34 of TOOL01 “Tool for the demonstration and assessment of additionally”. To demonstrate additionally by Simple cost analysis, each the instance project activity shall confirm and demonstrate that the SDWPs are distributed for free to the Users at community centers.

1.4 Project Design

Eligibility Criteria

The project is a grouped project, therefore for each new instance the following eligibility criteria are to be confirmed:

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Defined geographic area	The initial instance will be implemented in the households of Mekong River Delta in Viet Nam.	Project database

2	Technology	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. - Technologies for community water consumption, with project emissions. - Capacity: 2-3 l/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.	Technical specification from manufacturer / Equipment contract.
3	Additionally	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 12) and paragraph 33 and 34 of TOOL01 “Tool for the demonstration and assessment of additionality”. To demonstrate additionality by Simple cost analysis, each instance shall confirm and demonstrate that the SDWPs are distributed for free to the Users at community centers. The water from the SDWPs are free of cost of end users during the operation of the SDWPs.	The project activity instance is eligible when the project proponent shall provide the evidence for each instance that the SDWPs are distributed for free to the Users at community centers.

4	End user	The project proponent will distribute all SDWPs under proposed project to individual households. The same can also be verified by agreements to be signed with SDWP users, confirming that traditional wood stoves were used for boiling water in the baseline situation and type of user.	- Beneficiary agreement - Project database
5	Project owner ship	A default Beneficiary Agreement for end users including the provision that emission reductions generated by the stove are owned by the project proponent will be provided for project activity instance.	Beneficiary Agreement
6	Start date	The project activity instance has start date of 01/11/2021, the expected date on which the first SDWP is distributed.	- First SDWP distribution record, and/or - Shipping orders of SDWP.
7	Double counting	The SDWP distributed in any project activity instance shall be uniquely identifiable by unique system and will be supported by the distribution records. Each SDWP distributed will include instance assignment and will have corresponding end user details (i.e. name, address etc.).	Each SDWP in activity is uniquely identifiable and not part of any other VCS registered project.

1.5 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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1.6 Other Entities Involved in the Project

Not Applicable.

1.7 Ownership

The Project Ownership is with “Sustainability Investment Promotion and Development Joint Stock Company. (SIPCO).” who is also the Coordinating & Managing Entity of the project.

1.8 Project Start Date

The expected starting date is on 01/11/2021

As per section 3.7 of the VCS Standard (v4), 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 SDWP under the project has been expected operating from 01/11/2021. Thus, the project start date is expected as 01/11/2021.

1.9 Project Crediting Period

Fixed crediting period has been chosen.

Start date of crediting period : 01/11/2021

End date of crediting period : 31/10/2031

Total number of years¹ : 10 years, 00 months.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated volume of emission reduction from the project activity is 1,202,693 tCO₂/year which larger than 300,000 tonnes of CO₂e per year. Therefore, in accordance with the para 3.9.1 of the VCS Standard, v4 the scale of the project activity is under “Larger Project” category

Project Scale	
Project	
Large project	X

¹ The lifetime of the proposed ICS under instance project activity is 5.0 years, hence the crediting period will be 5.0 years in case no redistribution of ICS to end users.

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	1,202,693
Year 2	1,202,693
Year 3	1,202,693
Year 4	1,202,693
Year 5	1,202,693
Year 6	1,202,693
Year 7	1,202,693
Year 8	1,202,693
Year 9	1,202,693
Year 10	1,202,693
Total estimated ERs	12,026,930
Total number of crediting years	10
Average annual ERs	1,202,693

1.11 Description of the Project Activity

The purpose of this project is the dissemination of water purifiers in Mekong River Delta in Viet Nam. The project activity help to reduce the wood fuel consumption of traditional stove users by distributing water purifiers to households and/SMEs. By reducing the consumption of wood fuel, it can contribute to improving public health problems. Furthermore, this project activity can contribute to Viet Nam's climate change respond and sustainable development.

To reduce deforestation and the emission of greenhouse gas in Viet Nam, water purifiers that will lead to use no wood fuel, will be distributed to the household which is also using the traditional and/or conventional cookstoves to boil water with wood fuel. Over the long-term, this project activity is anticipated to reduce deforestation and the emission of greenhouse gas caused by using the burning of wood fuel.

In line with the applied CDM methodology AMS – III.AV, version 08 it is assumed that in the absence of the project, the baseline scenario would be the use of fossil fuels for boiling water. Therefore, by reducing the total amount of fuel required for boiling water, the water purifiers help reduces the amount of GHG emitted into the atmosphere. Emission Reductions

are calculated following the methodology on the basis of the mass of non-renewable woody biomass saved by the water purifiers.

To achieve the initial targeted volume of emission reductions, the project proponent aims to disseminate 600,000 SDWPs in Mekong River Delta Provinces in this grouped project.

Technology

According to the methodology AMS-III.AV. (Version 08.0), the proposed water purifier implemented by the grouped project is complied with either: (i) the Comprehensive Protection performance target as per “Evaluating household water treatment options: Health-based targets and microbiological performance specifications” (WHO, 2011) and “International Scheme to Evaluate Household Water Treatment Technologies” (WHO, 2014); or (ii) an applicable national standard or guideline. Also, all installed water purifiers do not emit greenhouse gases.

The technology employed in a specific location, water purifiers will be installed into surveyed and selected areas where there is no public distribution network supplying SDWP and no alternative SDWP supply facilities. In case a public distribution network exists, but is not supplying SDWP, water quality testing will be conducted to demonstrate that the water supplied from the public water network does not meet SDWP standards. The information such as the operational principle, instruction and maintenance management method of the water purifier will be transferred to beneficiaries.

The ceramic water filter is designed to improved drinking water quality, help to reduce and prevent intestinal disease. The filtered water is used for drinking directly without having to boil. The use of the water purifier is very simple, they can get clean and safe drinking water in a much easier way than before. The ability to store water safely for a long time without being re-contaminated thanks to the continuous release of silver ions (Ag⁺). The filter is capable of deodorizing chlorine and retains essential mineral components Ca²⁺/Mg²⁺.

A specification for project sample device is as follows:

Weight	8.3 kg	
Tank Capacity	25 liters	
Ceramic filter capacity	7 liters	
Removal of bacteria	99.99%	
Life span	10 years	
Material	Plastic, ceramic membrane, Nano silver, activated carbon	
Dimension	280mmx305mmx390mm	
Filter Flow rate	2-3l/h	

The technology/equipment will be replaced prior to the life span, so that end users can access the same or improved level of water purification systems

The project promotes energy efficient which directly reduces fuelwood consumption, which are non-renewable biomass having higher emission factor. As an associated benefit, the project directly helps reducing the rate of deforestation in the host country.

1.12 Project Location

The grouped project will be hosted by Viet Nam. The grouped project covers the 12 Provinces and one City of Mekong River Delta in Viet Nam.



Figure: Mekong River Delta Map

1.13 Conditions Prior to Project Initiation

As per the methodology AMS-III.AV (Version 08.0) for a simplified and standardized approach it is assumed that fossil fuel or non-renewable biomass (NRB) is used to boil water as means of water purification in the absence of the project activity. The emissions are calculated based on the energy demand for boiling water, and in case of displacement of NRB, the baseline emissions are corrected for the fraction of the biomass that can be demonstrated to be non-renewable. Only purified water consumed for drinking purposes can be used in the baseline calculation.

Households throughout Vietnam lack access to reliable safe drinking water, in Vietnam only 43.5% of the population use piped water, 56.5%² of the other households using water from the individual drilled well, none of these systems consistently supply safe water as they are not treated, and contamination is frequent. The piped water systems are often in disrepair due to aged systems and insufficient capacity for operation and maintenance.

The high proportion of non-renewable biomass demonstrates that typical household water boiling contributes to deforestation and threatens biodiversity. In Vietnam alone, 71%³ of rural households use firewood along with agricultural residue for cooking with significant portions of the population using unimproved cooking stoves – 51.6%⁴ in Vietnam, many families that purify water through boiling are left vulnerable to the negative effects associated with the emission of greenhouse gases, while those that do not boil, or only boil occasionally, suffer from waterborne diseases.

The Project follows AMS-III.AV: “Low greenhouse gas-emitting safe drinking water production systems”, Version 08.0. As this is a small-scale methodology, each the instance under the grouped project will achieve emission reductions below 60,000 tCO₂e per annum. Low greenhouse gas emitting water purification systems reduce fossil fuel and non-renewable biomass use, relative to the baseline scenario, thereby achieving emission reductions.

Sample surveys or reference literature will be used to determine the type of stoves and fuel used. The weighted average by total fuel consumption shall be used if more than one type of stove/fuel is used in the project area.

² <http://kinhtevadubao.vn/chi-tiet/174-8340--chi-co-khoang-49-cu-dan-nong-thon-duoc-tiep-can-nuoc-sach-theo-quy-chuan-.html>

³ Report by Global Alliance for Clean Cookstove (Page 7) <file:///C:/Users/ADMIN/Downloads/vietnam-market-assessment-mapping.pdf>

⁴ http://www.thestoveauction.org/uploads/2/4/8/5/24859908/2011_10_snv_ics_survey.pdf

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project activities under the grouped project are voluntarily coordinated action Sustainability Investment Promotion and Development Joint Stock Company. There is no mandatory law or requirement in Viet Nam to foster the dissemination of improved cook stoves and water purifiers.

Further to mention that in terms of local laws, statutes and regulatory frameworks etc. specific to the project type, there is no specific laws/policies available for water projects. The distribution and implementation of water purifier technology is not subject to any environmental impact assessment in accordance with:

1. Vietnamese Environmental Protection Law 2005.
2. Decree No. 21/2008/ND-CP dated 28 February 2008 on amending and supplementing a number of articles of the Government's Decree No. 80/2006/ND-CP of 9 August 2006 detailing and guiding the implementation of a number of articles of the Law on Environmental Protection.
3. Decree No. 18/2015/ND-CP dated on 14 February 2015 prescribing environmental protection master plan, strategic environmental assessment, environmental impact assessment and environmental protection plan.

Paragraph 1, Article 18, Chapter IV of Decree No.18/2015/ND-CP lists activities/projects that must prepare the environmental report which is detailed in Appendix 2 of this Decree. The distribution of water purifiers in households is not included in the list.

Thus, it can be concluded that there is no applicable local or regional law and regulatory framework in the host country with relation to water purifiers projects.

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

Not Applicable

1.15.2 Projects Rejected by Other GHG Programs

Not Applicable

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

No. The project will not generate any other form of GHG-related environmental credit for GHG emission reductions claimed under the VCS program. The serial ID number of each water purifier distributed under the project is recorded, and each unique serial ID is assigned to a single user whose details are recorded at the time of stove purchase. A searchable database containing these details enables cross checking.

The project activity under VCS shall not claim emission reductions for the same period that has been/will be covered under other GHG Programs. Thus, there will not be any possibility of double accounting of emission reductions

1.16.2 Other Forms of Environmental Credit

Not applicable.

1.17 Additional Information Relevant to the Project

Leakage Management

Not applicable, as project activity has been design to include only new water purifiers. No used water purifiers will be transferred or deployed from outside the geographical project boundary to the project activity.

Where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I. E (Switch from non-renewable biomass for thermal applications by the user). In accordance with that methodology, option (a), BE_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. If the equipment currently being utilized is transferred from outside from the boundary to the project boundary, leakage is to be considered.

Commercially Sensitive Information

Not Applicable.

Sustainable Development

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

1. 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.

2. 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.

3. 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

[Further Information](#)

Not Applicable.

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.

2.2 Local Stakeholder Consultation

Local stakeholders were invited to a consultation meeting on 18/04/2021 at the head of office of Viet Nam's Women Union. 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 which includes both the VCS grouped project. Many stakeholders attended the consultation meeting.

Mr. Hoang Anh Dung, the chairman of SIPCO made a presentation on the social, economic and environmental impacts of the project activity to local communities. The project activity aims to distribute 600,000 of water purifiers to households who using traditional cookstove to boil water at 12 Provinces of Mekong River Delta in Viet Nam. Mr Dung as well as a brief introduction of VCS projects. After the presentation and the questions and answer section made by the stakeholders

2.3 Environmental Impact

The implementation of the grouped project does not impose any severe impacts on the ecological system in the surrounding areas. This project activity will help in reducing the consumption of fuel wood by efficient fuel combustion thereby reducing deforestation and reducing indoor air pollution. The use of water purifier technology will reduce adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel will have sustainable benefit for all households/communities/Small and Medium Enterprises (SMEs) traditional cook stoves users included in the project activity. The implementation of the project will reduce workloads involved in fuel collection, and by reducing indoor air pollution, will reduce the risk of respiratory diseases, especially for women and children. Efficient or water purifiers will 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.

2.4 Public Comments

The following comments were made during the stakeholder meeting:

1. These poor households are mainly using traditional stoves which have smoke and very hot. If the project will implement, it will bring many benefits to poor and close to poor households.
2. The project of free distribution of Water purifier to households who are using traditional cookstove to boil water. These households have not to pay any fee so they are very happy.

The following suggestions were made during the stakeholder meeting:

1. The quality of water purifier must be guaranteed.
2. The project owner should be having information sessions, training, instructions for use, maintenance and replacement of filter cores guide.

2.5 AFOLU-Specific Safeguards

The grouped project is a non-AFOLU project activity, hence not applicable.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

AMS – III.A.V: “Low greenhouse gas emitting safe drinking water production systems”, version 08.0

3.2 Applicability of Methodology

	CDM Methodology Requirement	Justification
1	This methodology comprises introduction of low greenhouse gas emitting water purification systems to provide safe drinking water (SDWP). Water purification technologies that involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to, water filters (e.g. membrane, activated carbon, ceramic filters), solar energy	Under this grouped Project, low greenhouse gas emitting water purification will be distributed to households/SMEs. Detail of technology has been detailed in section 1.11 of this grouped VCS.

	powered ultraviolet (UV) disinfection devices, solar disinfection techniques, photocatalytic disinfection equipment, pasteurization appliances, chemical disinfection methods (eg. chlorination), combined treatment approaches (eg. Flocculation plus disinfection). The methodology is also applicable to water kiosks that treat water using one or more of the following disinfection. In case the water kiosk is using solar disinfection powders and solar implement measures to prevent recontamination (e.g. disinfecting containers, sealing containers and hygiene trainings).	
2	Soil filtration schemes (boreholes, wells) that include container disinfection (e.g. chlorination) may be applied. Project proponents shall demonstrate ex ante that rehabilitation and/or construction of the wells complies with relevant national and/or international standards and that measures are taken to ensure that water and well are not contaminated.	This is not applicable for this proposed project.
3	Prior to the implementation of the project activity, a public distribution network supplying SDWP) to the project boundary does not exist.	For each project activity instance shall proof that a public distribution network supplying SDWP does not exist in the project boundary. If during the crediting period SDWP is made available through a public distribution network, the emission reductions pertaining to the households, communities or SMEs supplied by the public system area cannot be claimed from that point onwards. This condition will be

		checked annually during the crediting period.
4	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 quantitative microbial measures of pre- and post-treatment challenge waters ⁶ 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 Viet Nam. The outlet quality water shall meet microbes defined in QCVN 6-1:2010/BYT for drinking waters.
5	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 instance

6	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, and that they deliver microbiologically safe drinking water.	Each water purifier shall confirm to the technology standards as per paragraph 4(b) of approved methodology AMS-III.AV Version 08. The outlet quality water shall meet microbes defined in QCVN 6-1:2010/BYT for drinking waters.
7	The use of this methodology in a project of activity under a programme of activities is legitimate if the leakage is estimated and accounted for as per the relevant provisions of AMS-I.E under the section for programme of activities.	Leakage is calculated by applying a net to gross adjustment factor of 0.95 to account for leakages.

3.3 Project Boundary

Source	Gas	Included?	Justification/Explanation
Baseline	CO ₂	Yes	Main emission source
	CH ₄	No	Minor emission source
	N ₂ O	No	Minor emission source
	Other	No	Minor emission source
Project	CO ₂	Yes	Main emission source
	CH ₄	No	Minor emission source
	N ₂ O	No	Minor emission source
	Other	No	Minor emission source

3.4 Baseline Scenario

As per the methodology AMS-III.AV (Version 08.0) for a simplified and standardized approach it is assumed that fossil fuel or non-renewable biomass (NRB) is used to boil water as means of water purification in the absence of the project activity. The emissions are

calculated based on the energy demand for boiling water, and in case of displacement of NRB, the baseline emissions are corrected for the fraction of the biomass that can be demonstrated to be non-renewable. Only purified water consumed for drinking purposes can be used in the baseline calculation.

Households throughout Vietnam lack access to reliable safe drinking water, in Vietnam only 43.5% of the population use piped water, 56.5%⁵ of the other households using water from the individual drilled well, none of these systems consistently supply safe water as they are not treated, and contamination is frequent. The piped water systems are often in disrepair due to aged systems and insufficient capacity for operation and maintenance.

The high proportion of non-renewable biomass demonstrates that typical household water boiling contributes to deforestation and threatens biodiversity. In Vietnam alone, 71%⁶ of rural households use firewood along with agricultural residue for cooking with significant portions of the population using unimproved cooking stoves – 51.6%⁷ in Vietnam, many families that purify water through boiling are left vulnerable to the negative effects associated with the emission of greenhouse gases, while those that do not boil, or only boil occasionally, suffer from waterborne diseases.

The project follows AMS-III.AV: “Low greenhouse gas-emitting safe drinking water production systems”, Version 08.0. As this is a small-scale methodology, each instance under the project will achieve emission reductions below 60,000 tCO₂e per annum. Low greenhouse gas emitting water purification systems reduce fossil fuel and non-renewable biomass use, relative to the baseline scenario, thereby achieving emission reductions.

Sample surveys or reference literature will be used to determine the type of stoves and fuel used. The weighted average by total fuel consumption shall be used if more than one type of stove/fuel is used in the project area.

3.5 Additionality

The proposed project activity is 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.

Under this grouped project, the additionality of the project activity is demonstrated by a barrier analysis that is in line with EB 99, Annex 03, Tool 21 - “Demonstration of additionality

⁵ <http://kinhtevadubao.vn/chi-tiet/174-8340--chi-co-khoang-49-cu-dan-nong-thon-duoc-tiep-can-nuoc-sach-theo-quy-chuan-.html>

⁶ Report by Global Alliance for Clean Cookstove (Page 7) <file:///C:/Users/ADMIN/Downloads/vietnam-market-assessment-mapping.pdf>

⁷ http://www.thestoveauction.org/uploads/2/4/8/5/24859908/2011_10_snv_ics_survey.pdf

of small-scale project activities” (Version 12). The project demonstrates the existence of an Investment Barrier. Procuring, installing SDWPs requires capital, which is a barrier to the end user of the Project due to difficulties in accessing capital, a wide dissemination of such technology in the Host Country is unlikely. The actions under the Project will alleviate these barriers by distributed free SDWPs to households.

The distribution of SDWPs require capital. The proposed project will distribute SDWPs free of cost to users which means no money shall be charged to users for the distribution of SDWPs; hence there is no financial return from the project other than revenue from the sale of GHG credits. As each SDWP has costs associated with the purchase and operation of the equipment, this project will not occur in the absence of GHG credits revenue. The action is not financially viable without the support of revenues from the sale of GHG credits. Currently, no similar technology penetration is there in Host Country. The actions under the Project will alleviate these barriers by promoting free distribution of SDWPs for Users.

As explained above, the instances of the grouped project shall demonstrate additionality by Simple cost analysis, by demonstrating the eligibility criteria that installation of SDWPs are free of cost to users.

Hence in line with paragraph 10 a) of EB99 Annex-03 and Paragraph 33 and 34 TOOL01 “Tool for the demonstration and assessment of additionality”, the project faces an investment barrier and is additional.

3.6 Methodology Deviations

Not applicable

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 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 (tCO ₂ /TJ).

4.2 Project Emissions

Refer to section 4.4 for the calculation of emission reductions resulting from the proposed project. There is no project emissions considered.

4.3 Leakage

Where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I. E version 09.0 explained below:

By will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

If the equipment currently being utilized is transferred from outside the boundary to the project boundary, leakage is to be considered

4.4 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)

Baseline emissions

The baseline emissions shall be calculated as follows:

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

This methodology requires methodological choices to be made as follows:

Determination of the quantity of purified water serviced by the project activity in year y

The quantity of purified water is the total of water treated by the project activity in year y

As per paragraph 16 of the applied methodology AMS-III.AV (Version 08.0), the quantity of purified water in a year should be monitored and calculated based on the following options:

$$QPW_y = P_y \times \min(QPW_{pp}; 5.5) \times 365$$

Where:

P_y : Population who consumes the purified water serviced by the project activity in year y

QPW_{pp} : Average volume of drinking water per person per day L/person/day determined ex ante of the crediting period through a baseline survey

The number of water purifiers which are distributed in this grouped project activity is 600,000 units.

As per baseline survey implemented at MeKong River Delta Provinces, the average number of person in a household in this province is 4.5 person/household.

So the population who consumes the purified water service by the project activity in year is $600,000 \times 4.5 = 2,700,000$ persons.

The average volume of drinking water per person per day is 5.1/person/day which 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

$$QPW_y = P_y \times \min(QPW_{pp}; 5.5) \times 365 = 2,700,000 \times 5.1 \times 365 = 5,026,050,000 \text{ l/year}$$

Determination of the fraction of fuel type (Non - renewable biomass)

For biomass, the fraction is 0.8933 which is determined at the instance level as per TOOL30 "Calculation of the fraction of non – renewable biomass", version 02.

Determination of the efficiency of the water boiling systems.

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 systems 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.

The project proponents will distribute the SDWPs for the households who have used the traditional cookstove to boil water. Therefore, the efficiency of the water boiling systems is 0.1.

Determining the specific energy consumption required to boil one litre of water

$$SEC = \frac{[WH \times (T_f - T_i) + 0.01 \times WHE]}{n_{wb}}$$

Where:

$$WH = 4.186 \text{ KJ/LoC}$$

$$T_f = 100^\circ\text{C}$$

$$T_i = 20^\circ\text{C}$$

$$WHE = 2,260 \text{ KJ/L}$$

$$n_{wb} = 0.10$$

$$SEC = [4.186 \cdot (100-20) + 0.01 \cdot 2,260] / 0.10 = 3,575 \text{ (KJ/L)}$$

The baseline emission can be calculated by the equation.

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

$$= 5,026,050,000 \times 1 \times 0.9805 \times 3,575 \times 0.9387 \times 0.8933 \times 85.7 \times 10^{-9} = 1,265,992 \text{ tCO}_2/\text{year}.$$

Emissions reductions will be calculated as:

$$ER_y = BE_y \times 0.95 = 1,265,992 \times 0.95 = 1,202,693$$

$$ER_y = 1,202,693 \text{ tCO}_2/\text{y}$$

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	1,202,693	0	0	1,202,693
Year 2	1,202,693	0	0	1,202,693
Year 3	1,202,693	0	0	1,202,693
Year 4	1,202,693	0	0	1,202,693
Year 5	1,202,693	0	0	1,202,693
Year 6	1,202,693	0	0	1,202,693
Year 7	1,202,693	0	0	1,202,693
Year 8	1,202,693	0	0	1,202,693
Year 9	1,202,693	00	0	1,202,693
Year 10	1,202,693	0	0	1,202,693
Total	12,026,930	0	0	12,026,930

5 MONITORING

5.1 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	5.1
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	n _{wb}
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 systems 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 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 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	0.9387
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 93.87% % 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	f_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	0.8933
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 02.0. As per “TOOL30: Calculation of the fraction of non-renewable biomass” For fossil fuel, the default value is 1.0
Purpose of Data	Calculation of baseline emissions
Comments	

Data / Parameter	$EF_{\text{projected fossilfuel}}$	
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	0.9805
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	

5.2 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	A survey shall be conducted annually to check the number of persons who concern the purified water supplied by functional project appliances.
Frequency of monitoring/recording	Annual
Value applied	2,700,000
Monitoring equipment	-

QA/QC procedures to be applied	Data will be collected using standard procedures and will be kept for two years after the end of the crediting period or the last issuance of GHG Credits for this project activity, whichever occurs later.
Purpose of 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.
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: $QPW_y = P_y \times \min(QPW_{pp}; 5.5) \times 365$
Frequency of monitoring/recording	Annual
Value applied	5,026,050,000
Monitoring equipment	-
QA/QC procedures to be applied	NA
Purpose of 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 report
Description of measurement methods and procedures to be applied	Every year, SWD need to be tested on a sample basis (through a statistically representative sample) by an accredited Laboratory to ensure the following conditions that: (a) They only use technologies that are meeting the SDWP Technology standards as per paragraph 4(b) (b) They are still operating or are replaced by an equivalent in service appliance. The use of appliances shall be monitored through self – report measures (survey data from respondents) as well as physical signs that are observable (e.g. wetness of the unit, water in storage receptacle, functionality of parts) as per “Objective measures of functionality and use of project appliances” describe in the Appendix (c) They are delivering microbiologically safe drinking water and shall met the 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. Emission reductions cannot be claimed if over 10% of appliances in the project activity fail to meet the final water quality requirements mentioned above.
Frequency of monitoring/recording	Annually
Value applied	1
Monitoring equipment	-
QA/QC procedures to be applied	The sampling plan shall also include provisions to collect information for records of replacement of appliances, filters and maintenance
Purpose of 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
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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
Description of measurement methods and procedures to be applied	Monitoring shall include annual check if there is public distribution network supplying SDWP
Frequency of monitoring/recording	Annually
Value applied	-
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of 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	Project activity site
Description of measurement methods and procedures to be applied	At least every two years, SWDs need to be tested by accredited Laboratory on a sample basis.
Frequency of monitoring/recording	Once every two years
Value applied	-
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of baseline emission
Calculation method	-.
Comments	Emission reductions cannot be claimed if project activity fails to meet SDWP standards

5.3 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 08.0), which refers to the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (Version 04).

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 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 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 will be to meet the monitoring requirements set forth in the methodologies AMS-III.AV (Version 08.0). 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. 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, communities or SME) will be the total population served under the specific instance project activity or group of instance.

(c) Sampling method

Sampling will be conducted using simple 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 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.

1. Parameter P_y

For population who consumes the purified water serviced by the project activity in year y (P_y), 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).

The following assumptions are made to exemplify the sample size calculation for parameters: P_y

The instance Implementer will distribute 600,000 SDWPs and will provide clean drinking water to 600,000 households in Mekong River Delta Provinces. Based on the baseline survey that showed a household size of 4.5 persons per household, the population size, N is taken as 2,700,000 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:

$$n \geq \frac{1.96^2 \times 2,700,000 \times 0.9 (1-0.9)}{(2,700,000 - 1) \times 0.1^2 \times 0.9^2 + 1.96^2 \times 0.9 (1-0.9)}$$

Which comes out to be

$$n \geq 42.68$$

$$n = 43$$

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.

2. Parameter m

For Fraction of functional appliances that are meeting the SDWP Standard (m), 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

$N=N_y$: 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

Substituting the values in above equation gives the value of n = [Number of user to be sampled] (round up).

The following assumptions are made to exemplify the sample size calculation for parameter: m

The instance Implementer will distribute SDWPs under proposed instance. Hence, population size, N is taken as 600,000 SDWPS.

The expected mean of functional appliances that are meeting the SDWP Standard is 0.9 and its standard deviation is 0.09 for m .

Based on the above assumptions, the sample size calculation for a 95/10 confidence/precision would be

$$n \geq \frac{1.96^2 \times 600,000 \times (0.09/0.9)^2}{(600,000 - 1) \times 0.1^2 + 1.96^2 \times (0.09/0.9)}$$

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 08.0))

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 08.0):

Monitoring Parameter	Fraction of functional appliances				
Sampling approach	Stratified random sampling based on stove year of distribution				
Stratum Number	Year of Distribution	Population Size	Expected Mean	Expected Standard Deviation	Calculated Sample Size
Year 2021	2021	600 ,000	0.9000	0.090	7
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

The adjusted sample size obtained after applying Student's t-distribution is 7. Therefore, in this case a sample size of 7 is to be sampled from each primary sampling unit.

3. 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:

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

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

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

Substituting the values in above equation gives the value of n = [Number of user to be sampled] (round up).

The following assumptions are made to exemplify the sample size calculation for parameter: Quality of safe drinking water.

The project proponent will distribute SDWPs under proposed instance. Hence, population size, N is taken as 600,000 SDWPS.

The expected mean of functional appliances that are meeting the SDWP Standard is 0.9 and its standard deviation is 0.09 for m .

Based on the above assumptions, the sample size calculation for a 95/10 confidence/precision would be

$$n \geq \frac{1.96^2 \times 600,000 \times (0.09/0.9)^2}{(600,000 - 1) \times 0.1^2 + 1.96^2 \times (0.09/0.9)}$$

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 08.0))

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 08.0)):

Monitoring Parameter	Fraction of functional appliances				
Sampling approach	Stratified random sampling based on stove year of distribution				
Stratum Number	Year of Distribution	Population Size	Expected Mean	Expected Standard Deviation	Calculated Sample Size
Year 2021	2021	600,000	0.9000	0.090	7
Sample size determination					
Mean					0.9000
Standard Deviation (SD)					0.0900
$V_{\text{mean}} = (\text{SD}/\text{mean})^2$					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

The adjusted sample size obtained after applying Student's t-distribution is 7. Therefore, in this case a sample size of 7 is to be sampled from each primary sampling unit.

For each of the parameter, sample sizes will be sufficient to ensure that the precision of the sample means/proportion are in accordance to the Sampling Frame established for the instance with in the grouped project to estimate emissions reductions. In cases where survey results indicate that desired precision is not achieved, the low bound of corresponding confidence interval of the parameter value may be used as an alternative to repeating the survey. Alternatively, the survey may be expanded to reach the required confidence/precision. The sampling methodology will be accordance with the representative sampling methods provided by the methodology AMS-III.AV (Version 08.0) and other CDM sampling standard and guidelines as indicated along this section. There may be non-response from the target population. Thus, over sampling by 10% may be used

to avoid non response; however, sampling may be ceased once required confidence/precision is met.

(e) Sample Frame

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

Implementers and different models of SDWP. As explained below, to take the different characteristics of different project proponent and SDWP models and other factors that may affect estimates into consideration, this project shall be either sampled separately and independently, or grouped together under a single sampling plan across instance, in each case using strata that have unique combinations of these factors.

The total number of appliances installed under the grouped project and operated per type of technology in that monitoring period will be the total sampling frame per distributed technology. Out of these appliances, samples will be selected for the respective appliance type. Random numbers will be generated and saved in a computer file and these will then be used to select the samples from the project database.

2. Data to be collected

(a) Field measurements

Field measurement objectives and data to be collected are listed in section 5.3. The parameters to be sampled within this instance project activity as below:

Parameter	Description	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		At least biennially

To monitor the required parameters data will be collected from a statistically valid sample of SDWPs in the database for the monitoring period, as per this sampling plan. The method of collecting data will be field surveys and the frequency of data collection is as per the frequency defined for each parameter. Data will be collected from the field surveys, entered in the database and processed to be included in the monitoring.

The monitoring parameters are not subject to seasonal fluctuations as population numbers don't vary by season; appliances are either functional or not; and the quality of drinking water has to meet the required national standards.

The surveys for parameters P_y and m will be done by trained field personnel from the project proponent. Microbiological testing for parameter m and the Quality of safe drinking water will be established through an independent accredited laboratory in Viet Nam.

As per approved methodology AMS-III.AV (Version 08.0), the following guidance is being used for the representative sampling method:

"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". A 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters."

As per "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", version 04, the following Sampling plan has been developed.

As per paragraph 3 of "Standard: Sampling and Surveys for CDM project activities and programme of activities", version 08," The general requirements of sampling methods shall be applicable to this project activity with any requirement specified in the applicable methodologies having precedence".

(a) Quality Assurance/Quality Control:

The overall monitoring and the implementation of the sampling plan will be co-ordinated by the project proponent. 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 project proponents together with the project proponents. The project proponents will sample for parameters P_y , m and Quality of safe drinking water as per the requirement of methodology.

During the survey, in order to anticipate any low response rate and answers bias, mechanisms for avoiding non-sampling errors (bias) include good questionnaire design, well-tested questionnaires, possibly pilot testing the data collection, 10% will be applied over the determined sample size. The survey team will ensure that all questionnaires are complete. There is one person check and one person review all questionnaires. To remedy the incomplete questionnaires, additional households, communities or SMEs will be drawn randomly until the required number is met at per the sample size determined. There might be changes of getting outliers while sampling. The following approach will be used to identify and address outliers for the samples during monitoring. Outliers will be defined as those data points with values greater than three standard deviations from the mean of the sample.

Data points identified as outliers according to the above analysis will be examined further to correct for possible transcription and data entry errors, but will be omitted from the analysis if no such administrative errors exist.

All monitored data will be entered into the database. In case an error is made in data entry, original copies of all monitoring documents will be kept and filed per. The name, date, and contact details

of the surveyor will be detailed on all completed monitoring surveys, therefore allowing for the follow-up of all incomplete/unclear data.

Hard copies of all documents will be kept at the office of project proponent, or an alternative address nominated by them, and all data entered into a central record keeping database. The record keeping database will be used to record the results of all monitoring, with all data stored to be kept for at least two years after the crediting period or the last issuance of VRs for the project activity.

(b) Analysis

The data from the survey will be analyzed

- To determine the Population who consumes the purified water serviced by the project activity in year y (P_y)
- To determine the Fraction of functional appliances that are meeting the SDWP Standard (m)
- To determine the Quality of safe drinking water
-

Data will be used for the preparation of monitoring reports for each instance or a group of similar instance. The results of all monitoring will be entered into the management database. Where it is found that an installed water purification system is no longer in use, the installation will be removed from inclusion in the instance project activity.

(b) 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 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
- (c) Telephone 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.

If sampling is to be carried out for a group of instance, monitoring may be carried out any time before the annual deadline for each instance project activity to be included in the sampling effort, and should be conducted annually thereafter. The date of all monitoring shall be recorded in the database.

3. Organizational Structure

The Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) has a monitoring manager responsible for field staff training, QA/QC of the data, analysis and reporting into the monitoring report. SIPCO has a database manager who manages the process of collecting the information of installed SDWPs from the SDWP distributors and entering the data into the project database. For the monitoring survey, a monitoring team has been organized by the SIPO consisting of survey coordinator, survey supervisor and trained monitoring staff, who conducted the surveys

All data monitored and required for verification and issuance will be kept for two years after the end of the crediting period or the last issuance of VERs for the project activity, whichever is later.

Data Collection Team Organization Structure.

Monitoring Team			
The SIPCO (End user data checking and archiving)			
Field Staff (end user data collection)		Field Staff (end user data collection)	
End user	End user	End user	End user

APPENDIX

Use appendices for supporting information. Delete this appendix (title and instructions) where no appendix is required.