



Verified Carbon Standard

GROUPED PROJECTS FOR CAMBODIA IMPROVED COOKSTOVE

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The intention of the grouped project activity involves the installation of energy efficient Improved Cookstove (ICS) in the households (hereafter “users”) of Kingdom of Cambodia for cooking households. For this reason, this proposed project activity aims at reducing the woodfuel consumption of traditional stove users by distributing ICS to households. By reducing the consumption of woodfuel, it can contribute to improving public health problems. Furthermore, this proposed project can contribute to Cambodia's climate change respond and sustainable development

The project activity targets households with no previous ICS access. The geographical boundary is in Cambodia. ICSs 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 project activity will promote the dissemination of energy efficient ICS. This will in turn reduce deforestation and degradation of forests in Cambodia through participation of the people in adopting energy efficient stoves. This will also contribute to improvement in quality of lives of the people from Cambodia through reduction of drudgery, time and money spent on fuel wood collection and through improvement of indoor air pollution. Globally, the project will contribute by reducing emission of GHG into the atmosphere.

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 cooking energy demand.

Preventing double counting by multiple ICSs in beneficiary households:

Project proponent (PP) chose Women for Peace and Development (CWPD) as its distribution partner, an organization with a wide network from central to local levels, the ability to reach every household to investigate the baseline scenario and the ability to access advanced equipment in other carbon programs. To determine the initial list of beneficiaries for the project, the village and commune level of Cambodia conducted surveys as per the project criteria. One of the primary criteria for selecting beneficiaries is that these households must not receive similar products such as improved stoves and water filters from any another GHG program. The lists of households receiving improved stoves and water purifiers were clearly divided and separated to avoid duplication of beneficiaries. Afterward, the central-level CWPD consolidated the initial list and sent it to PP. PP then randomly selected samples, following the Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 09.0), which refers to the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 04), to conduct the baseline surveys. The final list of beneficiaries was created based on these results for distribution activities. The devices are distributed to households according

to the final list, with each end-user signing an agreement to confirm receipt of the device. This distribution process is overseen by the village/commune-level local authorities to prevent any duplication of households between projects.

The Grouped project will distribute free 800,000 ICSs to households who use the traditional cookstove for cooking meals. All the project instances to be included in this grouped project will be from within Cambodia only. The estimates of annual average GHG emission reductions of the grouped projects is 1,101,426 tCO₂e/annum.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	05-July-2023 is the approval date (Crediting period: 02-May-2022 to 01-May-2032)	VCS	Carbon Check (India) Private Limited	N/A

1.3 Sectoral Scope and Project Type

Sectoral scope ¹	03 – Energy Demand
Project activity type	Type II – Energy efficiency improvement project

1.4 Project Eligibility

1.4.1 General eligibility

As per para 2.1.1 of the VCS Standard, version 4.7, the project is eligible under the scope of the VCS Program because this project activity meets two the scopes of the VCS program:

Elements	Project applicability
1) The seven Kyoto Protocol greenhouse gases	The project activity and VM 0050 version 01.0 aims at CO ₂ reduction of non-renewable biomass.
2) Ozone-depleting substances (ODS).	Not applicable

¹ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

3) Project activities supported by a methodology approved under the VCS Program through the methodology approval process.	The grouped project applies VM 0050 version 01.0 which has been developed and approved by Verra.
4) Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval.	Not applicable
5) Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements	Not applicable

Further, it cannot reasonably be assumed that the project generates GHG emissions primarily for the purpose of their subsequent reduction, removal or destruction. All the target households involve in this grouped project activity are fully independent from the project proponent. The project aims to provide individuals with efficient or improved cookstove (ICS) which falls under the category of efficiency improvements in thermal applications, therefore it is eligible under the scope of VCS Program. As per VCS Standard Version 4.7, efficiency improvements in thermal applications (e.g., cook stoves) are not excluded, hence project is eligible under VCS.

Finally, the project is a renewable biomass activity in Cambodia. Therefore, the project activity is not excluded by the VCS Program under the circumstances indicated in Table 1 of para. 2.1.3 of the VCS Standard, v.4.7.

1.4.2 AFOLU project eligibility

Not applicable. The grouped project does not belong to the AFOLU projects category.

1.4.3 Transfer project eligibility

Not applicable. The grouped project has not been listed in other carbon registries.

1.5 Project Design

- ☐ Single location or installation
- ☐ Multiple locations or project activity instances (but not a grouped project)
- ☒ Grouped project

1.5.1 Grouped project design

For the inclusion of new project activity instance (PA), the project proponent shall ensure that it meets the eligibility criteria required by VCS Standard v4.7 and the methodology applied (VM 0050 v1.0) as below:

No.	Eligibility criterion - Category	Eligibility criterion – Required condition	Applicability
1	Meet the applicability conditions set out in the methodology applied to the project.	The new project activity instance will meet all applicability conditions of VM 0050: “Energy Efficiency And Fuel-Switch Measures in Cookstoves”, version 1.0	Until the updated PD, 49 PAs, including the grouped projects are compliant with the applicability conditions set out in the applied methodology VM 0050 as demonstrated in Section 3.2 of this project description.
2	Use the technologies or measures specified in the project description.	Each Instance under this Grouped project will consist of the distribution of Ecozen cookstove with a thermal efficiency of 38.44% to household users cooking with non-renewable biomass in the baseline scenario. The instance consists of replacement of conventional firewood cookstoves for biomass fired ICS as defined in the Grouped project.	Only Ecozen cookstove are distributed in the 49 PAs. The manufacturer’s technology is described on section 1.11 in this PD.
3	Apply the technologies or measures in the same manner as specified in the project description	Each instance under this grouped project shall consist of the distribution of ICSs with efficiency improvements in thermal applications of non-renewable biomass. Ecozen cookstove have a thermal efficiency of 38.44%, larger than 25%.	Only Ecozen cookstove what have specifications as description on section 1.11 of this PD.
4	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area..	The new project activity instances will be installed within Cambodia only and subject to the same baseline scenario determined in section 3.4	Until the updated PD, 49 PAs, including the grouped projects, are implemented in the households of 9 provinces who are using the traditional cookstove

			same baseline scenario described in section 3.4 of this document. The baseline cookstoves are traditional cookstoves or three-stone stoves using firewood, are confirmed from the baseline survey report submitted to VVB during validation.
5	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	All new project activity instances will use the activity method for demonstration of additionality. Step 1: Regulatory Surplus There is no mandated government programme or policy in host country of this project ensuring the distribution of new project activity instances. Step 2: Positive List The inclusion of new project activity instances will comply with positive list as it satisfies criterion 1 where it meets all the applicability conditions of the methodology Step 3: Project Method This step is not applicable under project activity because the stoves are provided at zero cost to the end-users.	Until the updated PD, 49 PAs, including the grouped project, are eligible when the project proponent shall provide the confirmation that ICSs are distributed for free of cost to households in 9 provinces in Cambodia. 49 PAs are additional and are described in section 3.5 of this PD.
6	Conditions that avoid double counting of emission reductions.	The new project activity instances will: 1. Apply a unique system (i.e. conformity letter) for ICS in each project instance, assigning a unique ID to each ICS and allowing to clearly identify each ICS and to which project instance it belongs. 2. Each ICS installed will include project instance assignment and will have corresponding	Each ICS in 49 PAs is uniquely identifiable and not part of any other CDM/VCS registered project or instance of the other grouped project. The ICSs are carried unique IDs comprised of the project activity instance number.

		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 ICS 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	
7	Target group	Each project instance will target end users which includes households who use traditional cookstove to cook meal.	Until the updated PD, 49 PAs, including the grouped projects, satisfy the criteria. Each households in 49 PAs must sign a beneficiary agreement to commit that they are using traditional cookstove
8	Occur within one of the designated geographic areas specified in the project description	New project activity instances will be located within the geographic boundaries of Cambodia. The new project instances geographic location will be defined in the monitoring reports	Until the updated PD, 49 PAs, including the grouped project, are located 9 provinces within project boundary in Cambodia. Evidence: Project database with contact details of households
9	Conform with at least one complete set of eligibility criteria for the inclusion of new project activity instances. Partial compliance with multiple sets of eligibility criteria is insufficient	New project activity instances must comply set of eligibility criteria for the inclusion of new project activity instances in the table	Until the updated PD, 49 PAs, including the grouped project, comply set of eligibility criteria for the inclusion of new project activity instances in section 1.3 and 1.4 of this PD
10	Be included in the monitoring report with sufficient technical, financial, geographic and other relevant information to	New Project Activity Instances must comprise monitoring plans that outline the technical, financial, geographic and other relevant information to enable	Until the updated PD, 49 PAs, including the grouped project, comprise monitoring plans that outline the technical, financial, geographic and

	demonstrate compliance with the applicable set of eligibility criteria and enable sampling by the validation/verification body	sampling by the validation/verification body.	other relevant information to enable sampling by the validation/ verification body
11	Have evidence of project ownership, in respect of each project activity instance, held by the project proponent from the respective start date of each project activity instance	New project activity instances will be demonstrated by project proponent as the same described in section 1.8 of the document.	Project ownership, as described in Section 1.7 of the project description, is applicable to 49 PAs included in this grouped project.
12	Have a start date that is the same as or later than the grouped project start date	New project activity instances will be started the same as or later than the grouped project start date is 02-May-2022.	The start date of PA 001 is 02-May-2022 is same as the GP start date is 02-May-2022. The remaining PA were started later than the grouped start date. Same can be verified by ER spreadsheet being submitted to the VVB
13	Only be eligible for crediting from the later of start date of the project activity instance or the start of the verification period in which they were added to the grouped project, through to the end of the total project crediting period.	The project is eligible for crediting since the crediting period begins at the start of the project activity, when the first cookstove is distributed, as reported in section 1.9. The eligibility of possible additional project activity instances will start from the later of either the start date of the project activity instance or the start of the verification period in which they were added to the grouped project.	Until the updated PD, 49 PAs, including the grouped project, are only eligible for crediting from its start date through to the end of the project crediting period. Also, these 49 PAs are only eligible for crediting from the start of the verification period in which they were added to the grouped project. This are confirmed to VVB during verification.
14	Not be or have been enrolled in another VCS project.	All of new project activity instances within this grouped project will be a new activity and not be or have been enrolled in another VCS project.	Until the updated PD, 49 PAs, including the grouped project, are implemented in Takeo within Cambodia. It is new activities and do not leave one VCS project and subsequently enroll another VCS project.

15	The project proponent shall include in a singular project all project activity instances within ten kilometers of another instance of the same project activity and with the same project proponent	The project activity instances adhere to the clustering requirements for multiple project activity instances. Moreover, the project activity instances adhere to the capacity limit requirements for multiple project activity instances set out in the VCS Standard 4.7 (i.e. instances of the same project activity may not be spread across more than one project if they are within 10 Km of each other).	The distance of instances within the grouped project and with the same project proponent in this monitoring period is more than 10 km. PP prioritizes one instance per province. In case, the same province more than one instance, there is only one instance in one district to ensure distance eligibility. Also, PP database administrator checks GPS according to database file before distributing. The address is detailed in databased file which is also provided to VVB in the verification period
16	Where a capacity limit applies to a project activity included in the project, no project activity instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: 1) Each project activity instance that exceeds one percent of the capacity limit shall be identified. 2) Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one	This eligibility criterion is not applicable. According to the applied methodology, there are no capacity limits defined. Therefore, the grouped project does not have any specified capacity limits applicable.	Not applicable.

	other instance in the cluster. Instances that are not within one kilometer of any other instance shall not be assigned to clusters. 3) None of the clusters shall exceed the capacity limit and no further project activity instances shall be added to the project that would cause any of the clusters to exceed the capacity limit		
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1.6 Project Proponent

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

1.7 Other Entities Involved in the Project

Not applicable. At present, SIPCO is the sole entity involved and no other entities involved in the grouped project.

1.8 Ownership

The ownership of carbon credits is the exclusivity with Sustainability Investment Promotion and Development Joint Stock Company (SIPCO), SIPCO is the coordinating & Managing Entity of the grouped project, the ownership of carbon credits shall be demonstrated through following indicative information:

SIPCO purchases improved cookstoves (ICS) directly from the cookstove manufacturer named Viet Charcoal Production Company Limited. The cookstove purchased contract shall be signed between the two parties for each project activity (project instance) in this grouped projects. Every contract will be attached with a statement or/and a beneficial agreement between the project owner (SIPCO) and the cookstove manufacturer, the statement or/and beneficial agreement is to

confirm that all carbon credits right from the purchased cookstoves for the project activity shall be remained to the project owner without affected result with cookstove manufacturer.

The ownership of carbon credits also is demonstrated through a beneficial agreement between the project owner, SIPCO, and the household who get a free distributed improved cookstove, the household shall be the end user, the beneficial agreement shall confirm that the household shall Irrevocably transfer all rights to any Carbon Credits that may be generated by the operation of the improved cookstove to SIPCO, and to take all reasonable steps to affect such transfer; the household irrevocably waive any rights to Carbon Credit in exchange for the free supply of the improved cookstove.

1.9 Project Start Date

Project start date	02-May-2022
Justification	As per section 3.7 of the VCS Standard (v4.4), 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 cookstove under the project has been operating from 02-May-2022. Thus, the project start date is as 02-May-2022.

1.10 Project Crediting Period

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

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

- ☐ < 300,000 tCO₂e/year (project)
☒ ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
02-May-2022 to 31-Dec-2022	736,094
01-Jan-2023 to 31-Dec-2023	1,101,124
01-Jan-2024 to 31-Dec-2024	1,101,124
01-Jan-2025 to 31-Dec-2025	1,101,124
01-Jan-2026 to 31-Dec-2026	1,101,124
01-Jan-2027 to 31-Dec-2027	1,101,124
01-Jan-2028 to 31-Dec-2028	1,101,124
01-Jan-2029 to 31-Dec-2029	1,101,124
01-Jan-2030 to 31-Dec-2030	1,101,124
01-Jan-2031 to 31-Dec-2031	1,101,124
01-Jan-2032 to 01-May-2032	368,047
Total estimated ERRs during the first or fixed crediting period	11,014,257
Total number of years	10
Average annual ERRs	1,101,426

1.12 Description of the Project Activity

The purpose of this project is the dissemination of improved cookstove (ICS) in Cambodia. The project activity helps to reduce the woodfuel consumption of traditional stove users by distributing improved cook stoves to households. By reducing the consumption of woodfuel, it can contribute to improving public health problems. Furthermore, this project activity can contribute to Cambodia's climate change respond and sustainable development.

To reduce deforestation and the emission of greenhouse gas in Cambodia, ICSs that will lead to use less woodfuel, will be distributed to the households which mostly use traditional and/or conventional cookstoves with the woodfuel. In relation to the type of ICSs, which has at least 25% efficiency, will be distributed to a target group (Household). Over the long-term, this project activity is anticipated to reduce deforestation and the emission of greenhouse gas caused by using the burning of woodfuel.

In line with the applied methodology VM 0050 “Energy Efficiency and Fuel-Switch Measures in Cookstoves”, version 1.0, it is assumed that in the absence of the project, the baseline scenario is the continued use of non – renewable wood fuel by target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity. Therefore, by reducing the total amount of fuel required for cooking, the replacement of traditional stoves by ICS 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 ICSs.

Technology

Emission reductions from the ICS units will be calculated using the latest approved methodology VM 0050. “Energy Efficiency and Fuel-Switch Measures in Cookstoves”, version 1.0; hence falling under the Type II project activity – Energy efficiency improvement projects.

A typical project activity instance will replace traditional firewood stoves with higher efficiency ICS that are more efficient than traditional fire wood stoves as they reduce heat loss and improve heat transfer and/or combustion efficiency. The ICSs are fuel efficient, resulting in a decrease in fuel use in comparison to conventional pre-project stoves while also reducing particulate matter and carbon emissions. Design considerations have also streamlined assembly and construction to reduce cost and production times.

The ICS models are fuel efficient, resulting in a decrease in fuel use in comparison to conventional pre-project stoves while also reducing particulate matter and carbon emissions. Design considerations have also streamlined assembly and construction to reduce cost and production times.

These stoves deliver the same energy output as thermal energy supplied in the baseline scenario with traditional stone fire

The ICSs are manufactured in Viet Nam. The manufacturer has had previous experience with the manufacture of cookstove and has a trained workforce for the production of the cookstove. The cookstove named Ecozen with characteristics below:

As per water boiling test conducted by GERES Biomass and Energy Laboratory (G-BEL), the thermal efficiency of the Ecozen ICS is projected to be 38.44%. The ICS has an expected lifespan of at least 10 years.

The Ecozen stove allows for significant savings of firewood compared to traditional stoves and is especially suitable for the cooking habits of the people in the target group. Its design ensures efficient combustion of fuel and cleaner fire and therefore uses considerably less fuel as compare to traditional stoves. This means speedy cooking, time and fuel savings, cleaner pans, kitchen walls and indoor atmosphere.



The Ecozen cookstove are being produced and planned for distribution for project activities instance in the grouped project. Other cookstove models will be added later if there are any plan to distribute them.

The project promotes energy efficient improved cooking stove (ICS) 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.

1.13 Project Location

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

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

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

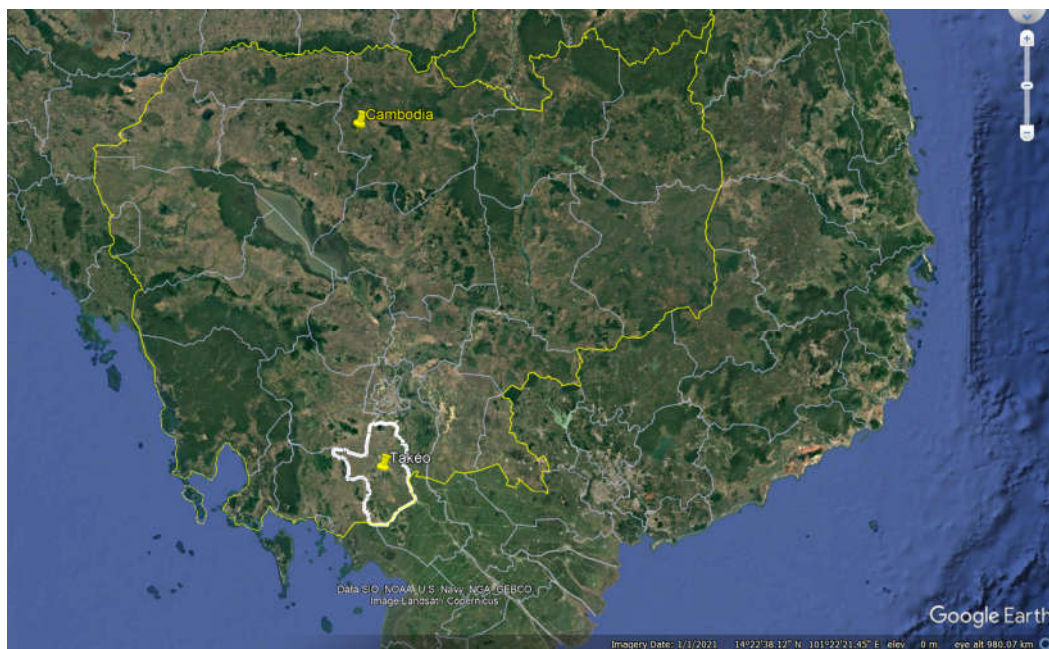


Figure 1: Map of Cambodia and Takeo province

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

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

1.14 Conditions Prior to Project Initiation

The project reduces the use and demand for fossil fuels and non-renewable biomass that would have been used in the traditional stove to achieve the same output (i.e. cooking daily meals) with the ICS. This directly leads to reduced GHG emissions. Therefore, the project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction. Prior to project initiation households are using traditional cooking stoves or three stone fires.

The population of Cambodia is 16,718,971 based on projections of World Bank data in 2020². Only 20% of the people in Cambodia live in urban areas, and there aren't many large cities and 80% of the population residing in rural area has to depend heavily on forests for their basic need³. Based on a document of World Bank, over 90 percent of energy used for cooking comes from wood, contributing to increased deforestation⁴. The use of wood for burning directly leads to reduced greenhouse gas emissions. Furthermore, it can be helpful to user's health.

The wood collected or harvested to fire traditional stoves. According to the approved methodology, in the absence of the project activity, the baseline scenario would be the use of wood fuel for the community to meet its energy need. Therefore, by reducing non-renewable biomass consumption (i.e. fuel wood), the grouped project is reducing anthropogenic GHG emissions.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

There are no laws and regulations governing the use of improved cookstoves in Cambodia households. The project is a voluntary effort by the project proponent.

A review is made on the main legislation below:

Law on Environmental Protection and Natural Resource Management⁵:

- To protect and promote environmental quality and public health through the prevention, reduction, and control of pollution;
- To assess the environmental impact of all proposed projects prior to the issuance of a decision by the Royal Government;
- To ensure the rational and sustainable conservation, development, management, and use of the natural resources of the Kingdom of Cambodia;
- To encourage and enable the public to participate in environmental protection and natural resource management;
- To suppress any acts that cause harm to the environment.

There is no negative concern made on improved cookstoves project from the above law.

² <https://data.worldbank.org/indicator/SP.POP.TOTL>

³ <https://worldpopulationreview.com/countries/cambodia-population>

⁴

<https://documents1.worldbank.org/curated/en/570931468036882999/pdf/696390ESW0P1010ECHOLOGIES0Cambodia.pdf>

⁵ https://cdc.gov.kh/wp-content/uploads/2022/04/Law-on-Environmental-Protection-and-Natural-Resource-Management_961224.pdf

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

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

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

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

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

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

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

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

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☒ Yes ☐ No

If yes:

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

☒ Yes

☐ No

If yes:

Has the project proponent(s) or authorized representative posted a public statement on their website saying, “Carbon credits may be issued through Verified Carbon Standard project Verra 2925 for the greenhouse gas emission reductions or removals associated with with Ecozen-25 water purifiers, manufactured by Viet Charcoal Production Company Limited in Di Su commune, My Hao District, Hung Yen province, Viet Nam, distributed by Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) whose emissions footprint is changed by the project activities.”

☒ Yes

☐ No

See evidence in Appendix 2 in the document.

1.18 Sustainable Development Contributions

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

A) Environment well-being:

- The project activity will contribute to the reduction in GHG emission due to reduction in use of non-renewable biomass and it can ensure natural recovery of forests and/or reforestation.
- The project activity will lead to reduction in indoor air pollutants from wood smoke and avoid smoke related health disorders.
- The reduction in non-renewable biomass consumption for cooking and boiling water through efficient use leads to improved ecological balance.
- The project activity will support fire prevention in the household kitchen.

B) Socio and Economic Benefits:

- Implementation of the project activity results in employment opportunities for people involved with installation, maintenance and distribution of these household biomass based cookers.
- The project activity will improve the status of living of people in households cooking since the community level implementation of units of these kinds can be carried out at considerably lower costs. There will be less dependence on firewood and its expenses and time associated with firewood buying and collection.

- Business development component of the project activity has resulted in the enhancement of capacity development and technical knowhow for moderately educated people in the community through workshops, seminars and training programs.
- The project will alleviate the work burden of women and children as they have to spend less time to collect firewood for cooking.
- Community health issues such as chronic lung diseases, acute respiratory infections, cataracts, blindness, and adverse effects on pregnancy will be decreased due to improvement of indoor air quality.

C) Technological benefit

- The introduction of locally manufactured technology with improved energy efficiency helps in technological self-reliance in the area.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

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

Additionally, the project activity applies Methodology VM 0050. “Energy Efficiency and Fuel-switch measures in Cookstoves”, version 1.0. According to the section 8.3 of the methodology, the default net to gross adjustment factor of 0.95 has been applied to account for leakage and therefore no surveys or no separate leakage management are required.

1.19.2 Commercially Sensitive Information

Not Applicable.

1.19.3 Further Information

Not Applicable.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Below stakeholders have been identified since valuation.

Stakeholder Identification

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

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

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

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

- Project ideation: Stakeholders could include academic institutions, self-help organizations, and local officials who can assist the project promoter in gaining traction in the community.
- Project development: government authorities, NGOs, community development, investors would be stakeholders at this stage.
- Project implementation: end-user, distribution partners, ICS manufactures, would be the stakeholders during implementation stage. Distribution partner of the grouped project is Cambodian Women for Development and Peace (CWPD) which has signed contract with SIPCO for distributing ICS to households. CWPD have system from central to village, they can know exactly these households who are using the traditional cookstove and they can select the correct end-users.
- Project validation and verification: surveyors, distribution partners, end-users... could be some of the main stakeholders during this stage.

Almost of project stakeholders affected by the project activity identified in the step 2.

	Step 3: Make the stakeholder category and determine direct/indirect effects based on each stakeholders identified in step 2 as the final step of the identification process. The final list of stakeholder includes ICS end-users, distribution partner (CWPD), government authorities, local NGOs and ICS manufactures. The full list of stakeholders has been provided to VVB as supporting document.
Legal or customary tenure/access rights	Not applicable. The grouped project only involves distribution ICS to household and it does not involve territories and resources.
Stakeholder diversity and changes over time	Most of stakeholders are identified at period of project activity, from starting, development, implementation and monitoring. There is insignificant change in stakeholders' diversity. 1. ICS end-users 2. CWDP 3. Government authorities 4. Local NGOs 5. Manufacturer
Expected changes in well-being	- Reduce deforestation and forest degradation in Cambodia through involvement of stakeholders in discontinuing the use of firewood for cooking meals - Community health issues such as chronic lung diseases, acute respiratory infections, cataracts, blindness, and adverse effects on pregnancy will be decreased due to improvement of indoor air quality. - Reduce in indoor air pollutants from wood smoke and avoid smoke related health disorders - The project activity will support fire prevention in the household kitchen.
Location of stakeholders	Except for the ICS manufacture in Viet Nam, the remaining stakeholders are in Cambodia
Location of resources	Cambodia

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	02-May-2022
Stakeholder engagement process	The process of engaging stakeholders in a culturally appropriate manner involved several steps: • Introduction: Stakeholder, Project developers • Context of objectives of public consultation • Presentation of Cambodia Improved Cookstove Project • Modalities of distribution and use • Environment and socio-economic impacts • Questions and answer with participants • Conclusion
Consultation outcome	SIPCO talked about how improving cooking methods in households may be achieved by switching to improved cookstoves (ICS). Since ICSs emit less smoke and particle matter than traditional stoves, households can use cooking that is cleaner and more efficient. By reducing fuelwood and lowering greenhouse gas emissions, ICS promotes environmental sustainability in addition to the health advantages of less indoor air pollution. Furthermore, households save time and effort by utilizing ICS, especially for women and children who are frequently in charge of cooking and collecting fuel. Adopting ICS is a worthwhile investment in sustainable living as it improves both the environment and household well-being.
Ongoing communication	SIPCO through Cambodian Women for Peace and Development (CWPD) to jointly distribute ICS to households. The CWPD network from district to commune to village level which receive any comments from households in using ICS. After that, CWPD will immediately report to SIPCO. Following details have been communicated to participants: Via email: info@carbonvietnam.com SIPCO will continue to implement these informal on-going consultation procedures, alongside formalized consultation through annual our survey

Stakeholder input	All stakeholders supported the project activities without negative comments. Specifically, 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. Also, the project of free distribution of ICS to households who are using traditional cookstove. These households have not to pay any fee so they are very happy.
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2.1.3 Free Prior and Informed Consent

Obtaining consent	It is entirely up to individual homes in the participating villages to decide whether or not they choose to take part in the adoption of ICS; this is a purely optional activity.
Outcome of FPIC	SIPCO distributes free of cost ICSs to households in Cambodia. Before the installation takes place, free, prior, and informed permission is obtained from households involved. Through the communication channels of CWPDP at the village and commune levels, households who are using traditional stoves for daily cooking register their demand to receive free cookstove from the project. This process is conducted voluntarily, with no force from CWPDP/SIPCO towards the people. After CWPDP and SIPCO check whether the households meet the project criteria, a list of end-users is compiled. Before receiving the product, the end-users are clearly informed about the beneficiary agreement and given the option to agree to the terms in the beneficiary agreement and accept the cookstove for free. This decision is entirely voluntary, with no force involved. If they agree, the end-users will provide their household information on the agreement, sign it, and receive the project cookstove for use. The grouped project activity involves distribution

of ICSs to households and it does not involve any land, relocated people, and physical or economic displacement.

2.1.4 Grievance Redress Procedure

Development process

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

Below mentioned mechanism will be used by stakeholders to communicate their grievances with project proponent:

- Communication via phone call (+855) 83 6666 019, stakeholders can call to representative of SIPCO in Cambodia or email info@carbonvietnam.com
- By informing CWPDP at levels or communication to CWPDP center via phone call (+855) 23 222 453 or email info@cwpgd.net

Grievance redress procedure

The grievance mechanism process could be illustrated as below:



- Receive Grievance

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

- Record

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

- Screen

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

- Acknowledge

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

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

- Investigate

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

- Act

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

	Follow up and close out The grievance owner makes contact with the external stakeholder/s three weeks after the grievance is resolved. When contacting the external stakeholder, the grievance owner verifies that the outcome was satisfied and also gather any feedback on the grievance process. Minutes of the meeting are recorded and saved. If required, the grievance owner may need to follow up with the external stakeholder on numerous occasions to confirm all parties are satisfied. All formal grievances are recorded in summary with the PP to identify if the complaint is a project wide issue that necessitates a system change in the implementation
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2.1.5 Public Comments

Comments received	Actions taken
The grouped project did not be received any comments during 30 days public comment period	

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

SIPCO has many years of experiences in implementing similar project activities and engaging communities. We have policies in place to inform management and employees about the avoidance of corruption, code of conduct, and business ethics. These policies are applied by all project staff, including company management to ensure that the organization is run in accordance with all legal requirements and is held to the highest standards of operation.

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure(s) taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	By implementing this project, traditional biomass fuel usage can be reduced, aiding in the mitigation of deforestation and soil erosion, thereby lowering the risk of natural disasters. These stoves produce less indoor air pollution compared to traditional methods, thereby diminishing the risk of respiratory illnesses,

		especially among vulnerable groups such as women and children.
Risks to stakeholder participation	No risk identified	The grouped project activities distribute ICS to household. They can decide to receive ICS or not. If they want, they can register to CWPDP. After CWPDP and SIPCO check that the households meet the criteria to participate in the project, before receiving ICS, household voluntarily signs the beneficiary agreement with SIPCO. There is no trade-off or any negative impact to their livelihood, land, food, etc... Hence no risk for stakeholders to participate in this project.
Working conditions	No risk identified	The grouped project activities create jobs for local people, ICS manufacture, distribution unit. All of working condition such as working hours, working environment, physical pressure, rest hour, minimum wage, etc... as per Cambodian Labor and Employment Law. Hence, no risk about working conditions for stakeholders to participate in this project.
Safety of women and girls	No risk identified	By replacing traditional cookstove to ICS, this helps households access to sustainable and modern energy. The proposed project aims to reduction in indoor air pollutants from wood smoke and avoid smoke related health disorders for households in Kingdom of Cambodia. Moreover, the project activity supports fire prevention in the household kitchen. From there, reduce polluted indoor air due to cook meal. So project's cookstove is safe when using. Hence, no any risk identified relate to safety of women and girls.
Safety of minority and marginalized groups, including children	No risk identified	By replacing traditional cookstove to ICS, this helps them access to sustainable and modern energy. The proposed project aims to reduction in indoor air pollutants from wood smoke and avoid smoke related health disorders for households in Kingdom of Cambodia. Moreover, the project activity supports fire prevention in the household kitchen. From there, reduce polluted indoor air due to cook meal. So

		project's cookstove is safe when using. Hence, no any risk identified relate to safety or minority and marginalized groups, including children.
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified.	The grouped project aims at reducing the woodfuel consumption of traditional cookstove, this can contribute to improving public health problems. This also contributes to improvement in quality of lives of the people from Cambodia through reduction of drudgery, time and money spent on fuel wood collection and through improvement of indoor air pollution. Globally, the project contributes by reducing emission of GHG into the atmosphere. Hence the grouped project brings positive benefits to the citizens and environments. The project activity is not any pollutant into the environment.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified ⁶	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	SIPCO distributes ICSs to households who are using woodfuel to boil drinking water without distinction in genders, races, religions, educational backgrounds or any other aspects. SIPCO also dedicate to the elimination of discrimination. The same is also governed by government policies and any such discrimination has considered a punishable offence in the host country. Cambodia is also party to the "Convention on the Elimination of All Forms of Discrimination against Women" and the project has aligned its labour policies accordingly.
Sexual harassment	No risk identified	
Equal pay for equal work	No risk identified	SIPCO provides equal pay for equal work.

⁶ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

Gender equity in labor and work	No risk identified	SIPCO is committed to ensuring that all stakeholders, regardless of their genders, colours, faiths, educational backgrounds, or any other factors, will be given an equal chance to fill all job positions. This commitment is fulfilled by providing equal access to employment opportunities. Before any full-time or part-time employees for the project are hired, the project proponent advertises applicable employment opportunities by contacting village heads and posting announcements on local notice boards seeking potential candidates for the positions. Also, the initiative encourages women, people with disabilities, and members of underrepresented groups to apply for the positions.
Forced labor	No risk identified	SIPCO does not tolerate child labor or forced, involuntary or trafficked labor in any form. To ensure this, workers have to give a job application to SIPCO. When recruiting, SIPCO checks ID card each worker to ensure that they are of working age. Besides that, workers also submit curriculum vitae verified by local authority.
Child labor	No risk identified	
Human trafficking	No risk identified	

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	Each of our workers has a contract that states their rights and obligations. The contract details comply with Vietnam labor laws. Specific information is provided on anti-terrorism and anti-corruption efforts, including a code of conduct. Per the Core Labor Conventions of the International Labor Organization (ILO), SIPCO respects, and works in tandem with the elimination of all forms of forced or compulsory labor, the effective abolition of child labor, minimum age convention, the right to organize, and the elimination of discrimination in respect of paid positions and occupation

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risk identified	The grouped project activities involve installing ICS and it does not involve any indigenous peoples and cultural heritage.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risk identified	The grouped project activity involves distribution of ICSs to households and only install at the informed invitation of the households and these ICSs do not infringe or interact with property rights.

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	In all the project activity instances under the project description, PP will provide the project cookstoves. Beneficiaries will be considered legal owners of the project cookstoves. The ownership rights of the carbon assets generated from this project will be with SIPCO, and SIPCO will sign a detailed end-user beneficiary agreement mentioning all the criteria with all beneficiaries before the commissioning of the project cookstoves.
Summary of the benefit sharing plan	The ownership rights of the carbon assets generated from this project will be with the project proponent, SIPCO. SIPCO has signed a detailed end-user beneficiary agreement mentioning all the criteria with all beneficiaries before commissioning the project devices. The agreement also explicitly states that the carbon rights are with SIPCO, and the same was explained to the beneficiaries before the installation of the project cookstoves.
Approval and dissemination of benefit sharing plan	No benefit sharing through carbon revenue is planned for end-users.

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	No risk identified	The implementation of the grouped project does not impose any severe impacts on the ecological system in the surrounding areas. The project activities help in reducing the consumption of fuel wood by efficient fuel combustion thereby reducing deforestation and reducing indoor air pollution. The use of ICS technology helps to reduce adverse environmental and social impacts associated with the use of non-renewable biomass. The reduced consumption of the stated baseline fuel has sustainable benefit for all household's traditional cook stoves users included in the project activity. The implementation of the project reduce workloads involved in fuel collection, and by reducing indoor air pollution, reduce the risk of respiratory diseases, especially for women and children. ICSs also contribute to environment protection by reducing biomass consumption and hence greenhouse gas emissions, mainly CO ₂ , when the combusted biomass originates from non-renewable stocks. Therefore, it has no impact to ecosystem health, no risk has been identified.
Soil degradation and soil erosion	No risk identified	
Water consumption and stress	No risk identified	

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes

☒ No

Species and habitat	Not applicable. The grouped project activity involves distributions of improved cookstoves to households in only and it does not involve rare, threatened and endangered species.
Areas needed for habitat connectivity	

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified	The grouped project activity involves distributions of improved cookstoves to households only and it does not involve rare, threatened and endangered species.
Areas for habitat connectivity	No risk identified	

2.4.2 Introduction of Species

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Not applicable			

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Not applicable	

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	No risk identified	The grouped project activity involves distributions of improved cookstoves to households only and it does not involve introduction of species.

2.4.3 Ecosystem Conversion

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risk identified	Not applicable. The grouped project activities only distribute improved cookstove to households and do not involve any ecosystem conversion.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	VM 0050	Energy efficiency and fuel-switch measures in cookstoves	1.0
Tool	Tool 33	Default value for common parameters	02.0

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
VM0050	1) The project activity corresponds to: a) Replacement of non-renewable biomass (e.g., firewood, charcoal)-fired cookstoves with any of the following: i) More efficient project devices that use the same fuel as in the baseline; ii) Efficient project devices fired by renewable biomass or bioethanol; iii) Efficient project devices fired by liquefied petroleum gas (LPG); or iv) Electric-powered project devices. b) Replacement of solid or liquid fossil fuel (e.g., coal, kerosene)-fired cookstoves with any of the following: i) Efficient project devices fired by renewable biomass or bioethanol;	a) The grouped project involves the replacement of non-renewable biomass fired cookstove with: i) The project cookstoves use firewood same as the fuel in the baseline. The fuel used for the project cookstove is the same as in the baseline. The project cookstoves have a higher efficiency of 38.44%. b) The grouped project is not based on solid or liquid fossil fuel.

	ii) Efficient project devices fired by LPG; or iii) Electric-powered project devices.	
	2) Project devices are used in households, communities, institutions, or small or medium enterprises (SMEs), collectively referred to in this methodology as the “target population.	The grouped project activity distributes ICSs to households in Cambodia.
Use of renewable biomass Not applicable		
<i>Cookstove characteristics and use</i>		
	8) Project devices using renewable biomass (fuel-switch) or non-renewable biomass (improved efficiency) are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 25%.	Project device is using non-renewable biomass fired cookstove with an initial thermal efficiency of 38.44%
	9) Project devices using LPG or bioethanol are single-pot, multi-pot portable, or in-situ cookstoves with an initial thermal efficiency of at least 30%	Not applicable.
	10) Electric project devices meet the maximum risk factor score of 15 on the Cookstove Durability Protocol and have the following minimum thermal efficiency: a) Hot plates and electric hobs: 40% b) Induction stoves and other electric stoves: 70%	Not applicable.

	11) Project devices using LPG comply with all of the following conditions: a) The baseline fuel either includes non-renewable biomass or is a more carbon-intensive fossil fuel (demonstrated by the baseline survey, see Section 6.2); b) The project has a provision for metering LPG supplied to each consumer at the LPG filling station, in order to determine household LPG consumption; and c) The project does not seek to issue any carbon credits for periods after 31 December 2045	Not applicable.
	12) Electric project devices use the following electricity sources: a) Decentralized renewable energy systems: Decentralized energy systems using fossil fuels are not eligible, except for backup generators that supply less than 1% of the annual electricity of the decentralized renewable energy system. b) Self-generated renewable electricity (with a maximum of 20% electricity from non-renewable sources for backup); or c) National or regional electricity grid.	Not applicable.
	13) The project proponent designs incentive mechanisms to reduce the use of inefficient baseline devices and practices that can be replaced by the project devices and	The grouped project distributes ICSs to households using traditional stoke to cook for meals. ICSs are distributed free, which serves as a direct financial incentive to switch from inefficient baseline devices. The project conjuncts

	describes these mechanisms in the project description.	with distribution partner (CWPDP) also include basic training to ensure proper use. These measures reduce reliance on traditional stoves and promote sustained adoption of the improved technology.
	14) Where a project device has ended its technical life, the project proponent either replaces it with a comparable or better project device or retrofits its essential components to continue meeting the minimum service level requirements (i.e., thermal energy generation), otherwise no further emission reductions may be claimed for the project device.	The project monitors the operational status of the cookstoves. When a stove reaches the end of its technical life, it is either replaced with a comparable or better-performing unit or retrofitted to ensure it continues to meet the minimum thermal energy service level. Only functioning stoves that meet these requirements are included in emission reduction calculations.
Avoiding harm and double counting		
	15) Project proponents implement a method for the distribution and identification of project devices that avoids double counting of emission reductions by other mitigation actions and includes unique product identification on the stove itself at the time of distribution/sale (e.g., program logo, alpha/numeric ID, and end-user location, such as geographic coordinates, complete address information).	Each ICS is uniquely identifiable and not part of any other CDM/VCS registered project or instance of the other grouped project. The ICSs will carry unique IDs comprised of the project activity instance number.
	16) The project complies with any national, sub-national, or local regulations or guidance for the installation, commercialization, distribution, and use of improved cookstoves and/or fuel supply and use for the target population. National, regional, and local regulatory frameworks for the provision of the type of thermal	The grouped project complies with national and local regulations for installing and distributing improved cookstoves in Cambodia. Details in 1.15 of the document. The project activity aims to improve air quality and emission reduction aligned with Sustainable Development Goals.

	energy services provided by the project activity must be documented.	
	17) Where project activities reduce emissions from non-renewable biomass, including firewood and charcoal, the risk of double counting is assessed on a national basis by evaluating at validation and crediting period renewal whether there are REDD+ projects or jurisdictional REDD+ programs whose project boundary overlaps with the expected fuel source area of the project. The project proponent must report on the findings of this assessment for informational purposes in the project description.	Currently, there are 8 REDD+ projects underway in the country as follows: 1. Verra ID 5071 aims to combat the climate crisis by expanding mangrove forest areas in Kampot and Kep province. 2. Verra ID 4853 is situated in the heart of Phnom Kravanh National Park in southern Cambodia 3. Verra ID 3434 is within the provinces of Ratanakiri and Mondulhiri 4. Verra ID 3341 is within Phnom Samkos Wildlife Sanctuary and Southern Cardamom National Park 5. Verra ID 1748 is within parts of Southern Cardamom National Park and Tatai Wildlife Sanctuary 6. Verra ID 1689 is within Prey Long Wildlife Sanctuary 7. Verra ID 1650 is within the Keo Seima Wildlife Sanctuary 8. Verra ID 904 is within Community Forests Oddar Meanchey The areas covered by these 8 projects are remote and sparsely populated, so cookstoves are not distributed there. At validation, the project conducted an assessment to evaluate the risk of double counting with existing REDD+ projects or jurisdictional REDD+ programs in Cambodia. The assessment found no overlap between the project's expected fuel source area and any active REDD+ initiatives.
Tool 33	This tool shall be applied in conjunction with the methodologies which refer to this tool to source the default values to estimate the	The project applies Tool 33 in conjunction with methodology VM0050 to source default values for estimating baseline emissions from the use of woody biomass for cooking. Default parameters

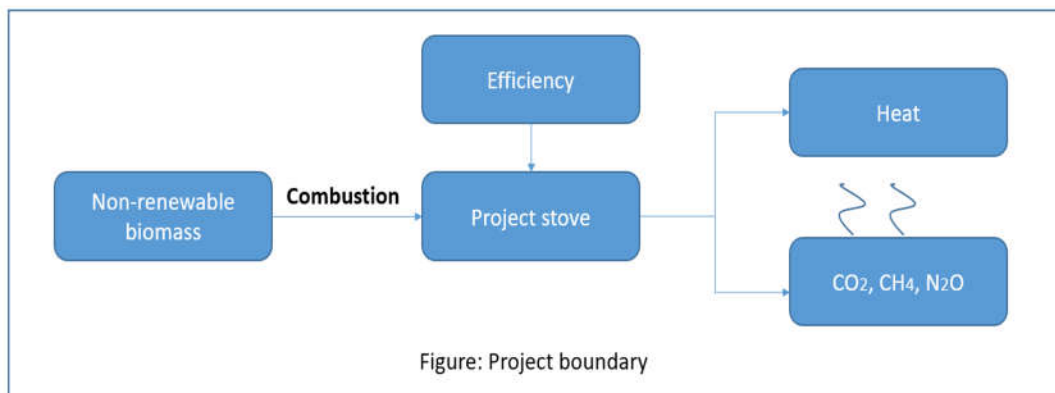
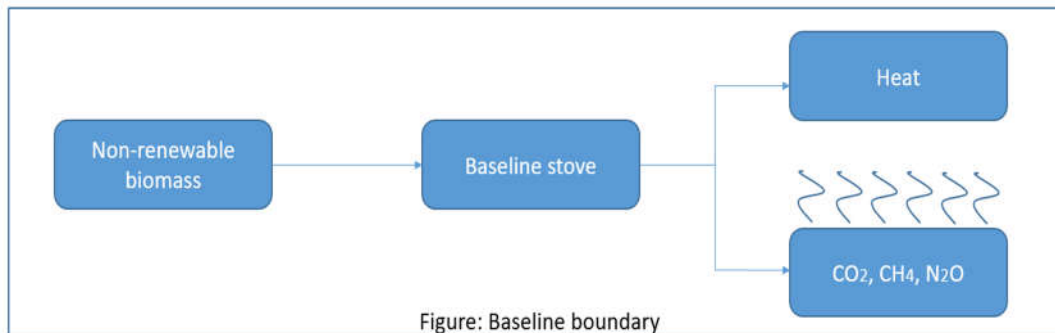
	baseline emissions (e.g. from the use of diesel for off-grid power generation, from the use of kerosene for lighting, from the use of woody biomass for cooking)	such as fuel consumption, emission factors, and the fraction of non-renewable biomass (NRB) are taken from Tool 33 to ensure consistency and transparency in baseline emission calculations. This application is in line with the requirement, as the methodology explicitly refers to Tool 33 for default values
	The default values as contained in section 5 of this tool are valid up to 10 March 2025. Notwithstanding the provisions on the validity of new, revised and previous versions of methodologies and methodological tools in the “Procedure: Development, revision and clarification of baseline and monitoring methodologies and methodological tools”, there will be no grace period for the application of this tool and the validity of the default values after this date, including in cases where further default values are added to this tool through revisions of this tool before this date.	The project applies the default values provided in Section 5 of Tool 33, which are valid until 10 March 2025. However, up to this point, there has been no update of tool 33 issued by UNFCCC. So all baseline emission calculations and related documentation are conducted in accordance with these valid values under tool 33 version 02.0. The project acknowledges that no grace period will be granted beyond this date and commits to updating the default values or methodological approach if revisions to Tool 33 are issued after 10 March 2025, in line with the applicable procedures.

3.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Emission from use of non-renewable biomass/fossil fuel	CO ₂	Yes	Major emission source
		CH ₄	Yes	Minor emission source
		N ₂ O	Yes	Minor emission source
		Other	No	No other source identified
Project	Emission from use of non-renewable biomass	CO ₂	Yes	Major emission source
		CH ₄	Yes	Minor emission source
		N ₂ O	Yes	Minor emission source
		Other	No	No other source identified

A representation of project boundary is depicted through following diagram.

ICS installation is in Cambodia



3.4 Baseline Scenario

Step 1: Identify alternative baseline scenarios

In the absence of the grouped project activity, households in the target region of Cambodia would continue to use the baseline cookstove. The baseline cookstoves are traditional cookstove or three-stone stoves using firewood or conventional device with no improved combustion air supply or gas ventilation and has an efficiency of 15% as per the applied methodology and the same is considered in the baseline estimations. These stoves rely primarily on firewood sourced from surrounding forest areas, which is largely considered non-renewable biomass due to unsustainable harvesting practices.

Alternative baseline scenarios considered include:

- (i) continued use of traditional firewood stoves.
- (ii) adoption of locally available biomass stoves with similar low efficiency,
- (iii) limited fuel switching to charcoal or other solid biomass (where accessible), and
- (iv) implementation of the same improved cookstove technology without carbon finance or registration under a GHG program.

The grouped project activity replaces these traditional cooking technologies with improved biomass cookstoves that operate with a thermal efficiency of 38.44%, significantly reducing firewood consumption and associated GHG emissions while maintaining the same thermal energy service.

The selection of the baseline scenario was based on a household survey conducted in the project area, which showed that the majority of households still rely on traditional stoves for daily cooking. This information was also cross-check with the research of World Bank. Refer to an research of World Bank, efficient cook stoves have been successfully introduced to about 40 percent of the urban population. However, in rural areas most households are still using the traditional “three stone stove”⁷.

Therefore, the continued use of traditional biomass cookstoves using firewood remains the most plausible and conservative baseline scenario for this project.

Step 2: Consider existing and forthcoming government policies and legal requirements:

As mentioned in section 1.15 in the document, at present, there are no mandatory government regulations or legal requirements in Cambodia that prohibit the use of traditional cookstoves or

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<https://documents1.worldbank.org/curated/en/570931468036882999/pdf/696390ESW0P1010ECHOLOGIES0Cambodia.pdf>

require households to adopt improved cooking technologies with minimum efficiency standards⁸. While some national strategies and policies promote the use of cleaner cooking solutions (e.g., under the Nationally Determined Contributions), these initiatives are non-binding and do not constitute enforceable regulations.

Additionally, there are currently no enforced air quality standards at the household level that would compel a shift from traditional biomass stoves to improved cookstoves. As such, the use of traditional stoves remains widespread and culturally embedded, particularly in rural and low-income communities.

Given the absence of mandatory and enforced legal requirements regarding cookstove efficiency or fuel type, none of the baseline alternatives are eliminated at this step. All identified alternatives, including the continued use of traditional biomass stoves, remain valid for further consideration.

Step 3: Assess financial, institutional, and information barriers:

A comprehensive assessment of the project context in rural Cambodia reveals several barriers that prevent the widespread adoption of improved cooking technologies without project support. These include:

1. Financial Barriers:

Households in the target areas are low-income and typically cannot afford the upfront cost of improved cookstoves. The initial investment is significantly higher than the traditional stoves (which are often constructed at no cost using locally available materials). Without external funding or subsidies, adoption of cleaner technologies remains financially unfeasible for the majority of households.

2. Institutional Barriers:

There is a lack of organized programs or institutional support for the promotion or distribution of improved cookstoves in the project regions. Public infrastructure and market mechanisms for clean cooking technologies are still underdeveloped, making it difficult for communities to access such technologies on their own.

3. Information Barriers:

Awareness about the health and environmental benefits of improved cookstoves is limited. Many households are unfamiliar with the availability or advantages of cleaner cooking solutions. Behaviour change is also constrained by deeply rooted traditional cooking practices passed down over generations.

⁸ https://cdc.gov.kh/wp-content/uploads/2022/04/Law-on-Environmental-Protection-and-Natural-Resource-Management_961224.pdf

Considering these barriers, alternative scenarios involving the voluntary adoption of improved cookstoves are not realistic in the current context. These alternatives are therefore eliminated from consideration.

As a result, the remaining and most plausible baseline scenario is:

i) Non-renewable biomass:

The continued use of inefficient traditional cookstoves fueled by non-renewable firewood remains the most likely baseline scenario. This scenario accurately reflects current household practices and cooking needs, and aligns with national trends of heavy dependence on fuelwood in rural areas.

The project follows VM 0050: “Energy Efficiency and Fuel-Switch Measures In Cookstoves” version 1.0. Improved cookstove of project activity with high efficiency helps to reduce 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.

A baseline survey was conducted before distributing ICSs by PP and CWPD at all level to confirm the type of baseline cookstove in December 2021 and baseline KPT test in January-February 2025 to assess the type and quantity of fuels consumed and the cooking technologies in use in the baseline scenario. The number of samples is calculated based on Guidelines for sampling and surveys for CDM project activities and programs of activities, v.04.0 and Standard Sampling and surveys for CDM project activities and programs of activities, v.09.0, detail description in section 5.3.

Households selection criteria:

The objective of the household selection criteria is to guarantee that households that are receiving the ICSs use firewood as their primary method of cooking, hence being applicable under the baseline scenario. The selection criteria will take the form of a questionnaire before the start of the ICS distribution, and will include binomial questions (yes/no answers) to assess the household's primary method of cooking fuel as follows:

1. Do you cook any meals in the house without using firewood?
2. Do you use charcoal for cooking in your household?
3. Do you use electric cooking in your household?
4. Do you use LPG for cooking in your household?

If any of the responses to these questions indicate that firewood is not the main fuel used in the household for cooking, this household will not be selected to participate in the project activity. These questions may be amended and improved upon with each ICSs distribution cycle.

Established controlled households:

Referring to the applied methodology and Correction 1, follow-up baseline surveys must be conducted every 5-years in controlled households that do not participate in the project. The control households were selected jointly by the PP and CPWD, comprising 1,000 households across nine provinces where the stoves were distributed. These households were identified as having pre-project conditions similar to those of the project households, including baseline fuel type, cooking technologies, and sources of fuel.

Applying simple random sampling approach as per requirements of applied methodology and CDM standard for sampling, PP will calculate the sample size to be surveyed out of this group of 1,000 households. To ensure that the survey results are representative of the entire population, required number of samples will be selected randomly so that each element of the population has equal probability of being selected. PP has done face to face survey and questionnaire annexed in appendix 3 has been used for the current survey. Same will also be used during all future monitoring.

Moreover, the detailed sample size calculation for the 11 households is provided in section 5.3 of the updated PD.

The results as below:

Type of fuel:

The survey team included questions in the baseline survey to assess baseline fuel consumptions patterns and habits. All of households use woods as the main fuel for cooking. Among 461 households being surveyed, none of them use gas, coal, oil or electricity for cooking. 100% of households use wood fuel for cooking.

Among 11 control households being surveyed, the results were the same, 100% of households used wood fuel for cooking.

Moreover, before starting the distribution of improved cookstove in a new area, PP conducts a feasibility check (through baseline survey) through which the proportion of using traditional cookstove is being confirmed. In case that the proportion of other cookstove is significant, the area will be discarded. At the time of distribution, households are checked for eligibility.

Baseline technologies for cooking

Based on the baseline study, it was reported that traditional stove is the most popular stove both in the Cambodia's households accounting for about 96.53% (445 households) and followed by both traditional and other cookstove being 3.47% (16 households). Other cookstove is such as improved cookstove. No household answer that they are using other stoves only.

Among 11 control households being surveyed, 100% of households are using traditional cookstove for cooking.

Survey results show that all selected households are using traditional cookstoves with 15% efficiency for cooking meal.

Source of fuel

All interviewed households, including 461 households and 11 control households reported that they collected firewood from nearby forests or their own gardens. None of the households had to purchase firewood for cooking.

Average household size and woody fuel consumption per household:

The KPT tests were conducted on 11 control households from 13-January-2025 to 08-February-2025, with the following results:

No	Member in household					Fuel used by traditional cookstove (kg/day)			
	Children (0-14 years)	Female > 14 years	Male 15-59 years	Male > 59 years	Total member Equivalent to adult male standard	Day 1	Day 2	Day 3	Average
HH 1	1	2	1	1	3.9	8.72	9.14	8.78	8.88
HH 2	1	2	1	1	3.9	9.14	8.49	9.52	9.05
HH 3	2	1	3	0	4.8	11.49	10.14	11.62	11.08
HH 4	1	2	1	1	3.9	8.57	8.93	9.54	9.01
HH 5	0	2	2	1	4.4	10.02	9.84	10.41	10.09
HH 6	1	2	2	0	4.1	9.38	10.5	8.75	9.54
HH 7	1	2	2	0	4.1	9.93	9.52	8.49	9.31
HH 8	1	2	3	1	5.9	12.04	12.92	11.06	12.01
HH 9	1	3	2	0	4.9	10.92	10.81	9.07	10.27
HH 10	2	2	1	0	3.6	9.14	7.11	7.89	8.05
HH 11	0	3	2	0	4.4	10.51	9.87	10.47	10.28
Average					4.35				9.78

In addition, during this PD update phase, PP also conducted the fourth monitoring period of the project. After calculating the sample size for parameter $n_{j,k,y}$, there were 54 representative samples participating in the interview. PP designed a questionnaire with a population size survey. The results showed that the total number of adults in these 54 representative samples was 4.34 adults per household.

Therefore, to ensure conservativeness for emission reduction calculation, PP chooses the value of parameter “average household size (HHi)” is 4.34 adults/household.

Comparison with the published literature

According to emission reduction methodology, utilizing a lower baseline consumption value considered a conservative approach. This practice ensures that the calculated emission reductions are not overstate.

Referring to the research paper under an international journal released in 2018, per capital consumption in Cambodia was 760 kg/capita/year⁹. End-users who are participated in the project activity are near-poor and poor households in rural with household size at 4.7 people/household¹⁰. Hence, quantity of firewood consumption is estimated at $760 \times 4.7 / 1000 = 3.57$ tonnes/household/year.

Also, according to a public research released in 2024, firewood is Cambodia's primary energy source, particularly in rural areas and among the poor. As of 2022, two million households used firewood for cooking¹¹. Besides, reference is made to a project that has already been issued credits under the UNFCCC platform, with the project number PoA 10030, issued in 2020. The component project activity 10030-P1-0004-CP1, implemented in Cambodia, was registered under the methodology AMS II.G approved by the UNFCCC¹². According to the project report, the amount of firewood saved through the use of the project stove is 3 tonnes/household/year, while the firewood consumption of the project stove is reported as 1.118 tonnes/household/year. Accordingly, the baseline stove consumption can be estimated at 4.118 tonnes/household/year.

In the other project on Verra platform with project ID 3116 issued in 2024¹³, quantity of woody biomass used by project devices is 1.09 tonnes/household/year, the amount of firewood saved by the project cookstove is 2.47 tonnes/household/year. Hence, the baseline stove is calculated at 3.56 tonnes/households/year.

Based on a comparative analysis of published study and existing project data with the region as above, the value determined by KPT survey of PP to calculate emission reductions is deemed highly conservative.

A review is made on the main legislation below:

Law on Environmental Protection and Natural Resource Management

- To protect and promote environmental quality and public health through the prevention, reduction, and control of pollution;

⁹ Differences in consumption rates and patterns between firewood and charcoal: A case study in a rural area of Yedashe Township, Myanmar by Zar Chi Win et al. dated 2018; <https://doi.org/10.1016/j.biombioe.2017.12.011>

¹⁰ <https://www.eria.org/uploads/LPG-Supply-Master-Plan-for-Cambodia.pdf>

¹¹ <https://www.ebsco.com/research-starters/environmental-sciences/cambodias-natural-resources>

¹² <https://cdm.unfccc.int/UserManagement/FileStorage/AOIR2UGTELHMZCB9DQXS4FV0K183Y5>

¹³ <https://registry.terra.org/app/projectDetail/VCS/3116>

- To assess the environmental impact of all proposed projects prior to the issuance of a decision by the Royal Government;
- To ensure the rational and sustainable conservation, development, management, and use of the natural resources of the Kingdom of Cambodia;
- To encourage and enable the public to participate in environmental protection and natural resource management;
- To suppress any acts that cause harm to the environment.

There is no negative concern made on improved cookstoves project from the above law.

The project activities instance to be included in this grouped project activity should meet the baseline scenario as mention above.

3.5 Additionality

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

- ☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

- ☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

- ☐ Yes ☒ No

In terms of local laws, statutes and other regulatory frameworks or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework, specific to the project type, there is no specific laws/policies available for cookstove projects.

3.5.2 Additionality Methods

Methodology VM0050 version 01.0 uses activity method for the demonstration of additionality.

Step 1: Regulatory Surplus

There is no mandated government programme or policy in host country of this project ensuring the distribution of domestic fuel-efficient cookstoves. The project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. Households may only participate voluntarily

in this project. It is hereby confirmed that the proposed project is a voluntary coordinated action by SIPCO.

Step 2: Positive List

1. Type of device distributed:

The grouped project distributed ICSs with efficient biomass-fired to replace traditional cookstoves with inefficient traditional biomass-fired. This aligns with criterion a) of methodology “Efficient biomass-fired cookstoves that replace inefficient biomass-fired cookstoves”

2. Distribution mechanism and revenue source:

The proposed project will distribute ICSs free of cost to users which means no money shall be charged to users for the distribution of ICSs; hence there is no financial return from the project other than revenue from the sale of GHG credits. As each ICS 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. The significant costs for this project activity, including ICS purchase cost, have been demonstrated to VVB

Step 3: Project Method

The grouped project will distribute ICSs free cost to end users which means no money shall be charged to users for the distribution of ICSs; hence there is no financial return from the project other than revenue from the sale of GHG credits. So this step is not applicable.

Conclusion: As the project fulfills the conditions above, it is deemed additional. New project activity instances will meet the additionality criteria of the grouped project.

3.6 Methodology Deviations

The project was originally developed under methodology VMR0006 version 1.1 but has now transitioned to methodology VM0050 version 1.0. This change was made to better align with the latest best practices and ensure compliance with the most updated requirements under the Verra framework. The deviation is more conservative than what is set out in the old methodology.

It includes several updates and changes that reflect current best practices of project design and implementation in distributed thermal energy generation. It also incorporates streamlined monitoring approaches such as prescribes robust means for the determination of parameter values (like fNRB), and contains updated default values for various ex-ante parameters (like baseline device efficiency).

No deviations from VM0050 have been made in the application of the methodology. All calculations, baseline assessments, and monitoring approaches strictly adhere to the provisions outlined in VM0050.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are calculated as follows:

$$BE_y = \sum_{i,j,k} EC_{i,y} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO_2} \times f_{NRB,y} + EF_{b,i,nonCO_2})$$

BE_y	:	Baseline emissions during year y (t CO ₂ e)
$EC_{i,y}$	:	Average energy consumption of baseline device type i in year y (TJ)
$N_{j,k,y}$	:	Number of commissioned project devices of type j from batch k in year y
$n_{j,k,y}$	:	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)
EF_{b,i,CO_2}	:	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ /TJ)
$f_{NRB,y}$	:	Fraction of woody biomass that is established to be non-renewable used by baseline device in year y; this variable is not considered for fossil fuels (fraction)
$EF_{b,i,nonCO_2}$	:	Non-CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario (t CO ₂ e/TJ)
i	:	Baseline device type and its respective fuel type
j	:	Project device type and its respective fuel type

4.1.1. Determination of average energy consumption of baseline device type i in year y (TJ) ($EC_{i,y}$)

As per calculation (2) of the applied methodology, $EC_{i,y}$ is calculated as follow:

$$EC_{i,y} = BC_{b,i,y} \times NCV_{b,i}$$

Where:

- $BC_{b,i,y}$: Fuel used per baseline device type i during year y (tonnes)
 $NCV_{b,i}$: Net calorific value of baseline fuel for baseline device type i (TJ/tonne)

PP has conducted the Kitchen Performance Test (KPT) In line with the applied methodology VM0050, ver 1.0 and KPT protocol. the sample size for the baseline KPTs was calculated in line with section 8.4(b) of the applied methodology, using the CDM Guideline for Sampling and Surveys, version 4.0. Using CDM Guidelines, the sample size for each parameter $BC_{b,i,y}$ (mean parameter) was 11 and were conducted on 11 control households from 13-January-2025 to 08-February-2025.

Procedures followed for Conducting KPT:

The KPT surveys were conducted by a competent team trained for the KPT surveys by SIPCO for performing KPTs, based on the KPT protocol. Once the villages were selected by the operational team, enumerators were issued with protocols for the selection of the individual households. These protocols outlined that the selected households should, but are not limited to, the following criteria in accordance with the KPT protocol:

- Have the person who is primarily responsible for cooking available for visits once a day for the next 3-4 days (For households where the survey took three days, the SIPCO team arrived early in the morning on the first day to provide an introduction and instructions to the families. For households where the survey lasted four days, the first day was dedicated to providing information and guidance);
- Not have any events scheduled that would disrupt normal cooking practices during this time (e.g Weddings, community events);
- Primarily cook on wood

Additionally, the enumerators were instructed to follow, but are not limited to, the following criteria in accordance with the KPT protocol

- Avoid a measurement campaign during special occasions, holidays, or any day when cooking is not normal and be aware of local events like market days that may involve above-average fuel consumption.
- To explain the purpose of the test to the family members and arrange to measure their fuel consumption.
- Stress to household members that their cooking practices should remain as close to normal as possible for the duration of the test.
- Explain to family members that the surveyor will visit the respondent daily to collect the information.

- Ask the family to define an inventory area to store the fuel during the test. Record the weight and moisture content of the initial stock of fuels and if the family is going to collect or purchase fuel during the days of the test, ask them to keep newly collected or purchased fuel separate from fuel that has already been tested for moisture and weighed.
- Visit each household at roughly the same time each day, without being intrusive.
- Record fuel consumption by weighing the remaining fuel. Record the weight and moisture content of newly collected fuel before it is added to the family's stock.

KPT results

The annual baseline fuel consumption per household was calculated from the KPT survey results of 11 households. The parameter was within the 95/10 confidence/precision which can be checked in the table below:

No	Member in household					Fuel used by traditional cookstove (kg/day)			
	Children (0-14 years)	Female > 14 years	Male 15-59 years	Male > 59 years	Total member Equivalent to adult male standard	Day 1	Day 2	Day 3	Average
HH 1	1	2	1	1	3.9	8.72	9.14	8.78	8.88
HH 2	1	2	1	1	3.9	9.14	8.49	9.52	9.05
HH 3	2	1	3	0	4.8	11.49	10.14	11.62	11.08
HH 4	1	2	1	1	3.9	8.57	8.93	9.54	9.01
HH 5	0	2	2	1	4.4	10.02	9.84	10.41	10.09
HH 6	1	2	2	0	4.1	9.38	10.5	8.75	9.54
HH 7	1	2	2	0	4.1	9.93	9.52	8.49	9.31
HH 8	1	2	3	1	5.9	12.04	12.92	11.06	12.01
HH 9	1	3	2	0	4.9	10.92	10.81	9.07	10.27
HH 10	2	2	1	0	3.6	9.14	7.11	7.89	8.05
HH 11	0	3	2	0	4.4	10.51	9.87	10.47	10.28
Average					4.35				9.78

According to the table above, the woody fuel used per baseline household ($BC_{b,i,y}$) is 9.78 kg/day = 3.5696 tonnes/year/stove

The project activity is replacing the traditional cookstove to improved cookstove. The traditional cookstoves only use wood fuel, so according to 2006 IPCC Guidelines for National Greenhouse Gas Inventories, the value of $NCV_{b,i}$ is 0.0156 TJ/tonne.

Therefore, $EC_{i,y} = 3.5696 \times 0.0156 = 0.0557$ (TJ)

4.1.2. Determination of CO₂ and non-CO₂ emissions factor

According to the most recent version for IPCC Guidelines for National Greenhouse Gas Inventories: the value of emission factor for the grouped project as below:

$$EF_{b,i,CO_2} = 112 \text{ tCO}_2/\text{TJ}$$

$$EF_{b,i,nonCO_2} = 9.46 \text{ tCO}_2/\text{TJ}$$

4.1.3. Determination of Fraction of woody biomass

The project cookstoves only use wood fuel. Besides, PP applied default value of the most recent version of CDM Tool33, so the value of $f_{NRB} = 0.3$.

Baseline emissions

The grouped project aims to distribute 800,000 cookstoves to 800,000 households in Cambodia. Assuming 100% of commissioned project devices. Therefore, the baseline emission during a calendar year can be calculated as below:

$$BE_y = \sum_{i,j,k} EC_{i,y} \times N_{j,k,y} \times n_{j,k,y} \times (EF_{b,i,CO_2} \times f_{NRB,y} + EF_{b,i,nonCO_2})$$

$$= 0.0557 \times 800,000 \times 1 \times (112 \times 0.3 + 9.46) = 1,918,263 \text{ (tCO}_2\text{e/year)}$$

4.2 Project Emissions

The project devices only use biomass. Hence, project emissions are calculated as following:

$$PE_y = \sum_j \sum_k BC_{p,j,k,y} \times N_{j,k,y} \times NCV_{p,j} \times n_{j,k,y} \times (EF_{p,j,CO_2} \times f_{NRB,y} + EF_{p,j,nonCO_2})$$

Where:

PE_y	:	Project emissions during year y (t CO ₂ e)
$BC_{p,j,k,y}$	:	Fuel used per project device type j during year y (tonnes)
$N_{j,k,y}$	:	Number of commissioned project devices of type j from batch k in year y
$n_{j,k,y}$	:	Proportion of commissioned project devices of type j from batch k that remain operating in year y (fraction)
$NCV_{p,j}$	:	Net calorific value of project fuel for project device type j (TJ/tonne)
EF_{p,j,CO_2}	:	CO ₂ emission factor for fuel used by project device type j in the project scenario (t CO ₂ /TJ)

$EF_{p,j,nonCO2}$: Non-CO₂ emission factor for fuel used by project device type j in the project scenario (t CO₂e/TJ)

4.2.1. Determination of fuel used per project device type i during year y

This parameter is determined annually. At the time of requantification, the PP also conducted the 4th monitoring for the project. Therefore, this parameter was determined through the KPT survey. Since this is an estimated ER for the PD, the PP applied the value of this parameter for stoves aged one year. Hence, the applied value is 1.4127 (tonnes).

4.2.2. Net calorific value of project fuel for project device type i

The project activity is replacing the traditional cookstove to improved cookstove which use wood fuel, so according to 2006 IPCC Guidelines for National Greenhouse Gas Inventories, the value of NCV_{b,i} is 0.0156 TJ/tonne.

4.2.3. Determination of CO₂ and non-CO₂ emissions factor

According to the most recent version for IPCC Guidelines for National Greenhouse Gas Inventories: the value of emission factor for the grouped project as below:

$$EF_{p,j,CO2} = 112 \text{ tCO}_2/\text{TJ}$$

$$EF_{p,j,nonCO2} = 9.46 \text{ tCO}_2/\text{TJ}$$

Project emissions

The grouped project aims to distribute 800,000 cookstoves to 800,000 households in Cambodia. Assuming 100% of commissioned project devices. Therefore, the project emission during a calendar year can be calculated as below:

$$PE_y = \sum_j \sum_k BC_{p,j,k,y} \times N_{j,k,y} \times NCV_{p,j} \times n_{j,k,y} \times (EF_{p,j,CO2} \times f_{NRB,y} + EF_{p,j,nonCO2})$$

$$= 1,4127 \times 800,000 \times 0.0156 \times 1 \times (112 \times 0.3 + 9.46) = 759,185 \text{ (tCO}_2\text{e/year)}$$

4.3 Leakage Emissions

Leakage emissions of the grouped project associated with reduced or avoided use of non-renewable biomass. Hence, as detailed in section 8.3 of the methodology VM 00050, Version 1.0, an adjustment factor of 0.95 is applied to the GHG emission reduction in Equation in section 4.4 below.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

Emission reductions are calculated by the equation as follows:

$$ER_y = (BE_y - PE_y) \times 0.95$$

Where:

ER_y Emission reductions during year y in t CO₂e

BE_y Baseline emissions during year y in t CO₂e

PE_y Project emissions during year y in t CO₂e

Emission reductions during a calendar year will be calculated as:

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCUs (tCO ₂ e)	Estimated removal VCUs (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
02-May-2022 to 31-Dec-2022	1,282,346	507,510	0	736,094	0	736,094
01-Jan-2023 to 31-Dec-2023	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2024 to 31-Dec-2024	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2025 to 31-Dec-2025	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2026 to 31-Dec-2026	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2027 to 31-Dec-2027	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2028 to 31-Dec-2028	1,918,263	759,185	0	1,101,124	0	1,101,124

01-Jan-2029 to 31-Dec-2029	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2030 to 31-Dec-2030	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2031 to 31-Dec-2031	1,918,263	759,185	0	1,101,124	0	1,101,124
01-Jan-2032 to 01-May-2032	641,173	253,755	0	368,047	0	368,047
Total	19,187,886	7,593,930	0	11,014,257	0	11,014,257

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EF _{b,i,CO2}
Data unit	t CO ₂ e/TJ
Description	CO ₂ emission factor for fuel used by baseline device type i in the baseline scenario
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$EF_{b,i,nonCO2}$
Data unit	t CO ₂ e/TJ
Description	Non-CO ₂ emission factor for fuel used by baseline device type <i>i</i> in the baseline scenario
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	9.46
Justification of choice of data or description of measurement methods and procedures applied	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$NCV_{b,i}$
Data unit	TJ/tonne
Description	Net calorific value of baseline fuel used by baseline device type <i>i</i>
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$BC_{ex-ante,b,i}$
Data unit	tonne
Description	Ex-ante annual average quantity of fuel used per baseline device type <i>i</i>
Source of data	Option 1: A measurement campaign following the Kitchen Performance Test Protocol must be designed, carried out, and

	analyzed in compliance with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per Section 4 of the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The result must be scaled appropriately using the average household size to obtain the value of $BC_{ex-ante,b,i}$
Value applied	3.5696
Justification of choice of data or description of measurement methods and procedures applied	N/A
Purpose of Data	Calculation of baseline emission
Comments	At the time of the methodology update, PP applied the value of $BC_{ex-ante,b,i}$ equal to the parameter $BC_{b,i,y}$. In accordance with the applied methodology VM0050, the average quantity of firewood consumed by the baseline stove is determined through the Kitchen Performance Test (KPT) conducted on representative samples from 13-January-2025 to 08-February-2025. Based on the KPT survey results, $BC_{b,i,y} = 3.5696$ tonnes/household/year = $BC_{ex-ante,b,i}$. Furthermore, the parameter $BC_{b,i,y}$ has been cross-checked against published literature, as referenced in Section 3.4 of this document.

Data / Parameter	$\eta_{old,avg}$
Data unit	Fraction
Description	Weighted average efficiency of baseline devices that are replaced by project devices
Source of data	The applied methodology. Default value for three-stone fire using firewood or a cookstove with no improved combustion air supply or flue gas ventilation
Value applied	0.15
Justification of choice of data or description of	These methods and sources are recognized by the VCS Program

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emission
Comments	N/A.

Data / Parameter	Hh _i
Data unit	Equivalent standard male adults
Description	Average household size of the target population using device type <i>i</i>
Source of data	Baseline survey The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average household size.
Value applied	4.34
Justification of choice of data or description of measurement methods and procedures applied	Recognized survey methods based on the CDM <i>Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities</i>
Purpose of Data	Estimation of average energy consumption
Comments	This parameter must be determined ex ante via the baseline survey as described in Section 6.2 of the applied methodology. Equivalent standard male adults according to Guidelines for Woodfuel Surveys for FAO by Keith Openshaw, cited in Joseph, S. (1990). <i>Guidelines for Planning, Monitoring and Evaluating Cookstove Programmes</i> , UNFAO: Community Forestry Field Manual 1.

Data / Parameter	EF _{p,i,CO2}
Data unit	t CO ₂ e/TJ
Description	CO ₂ emission factor for fuel used by project device type <i>i</i> in the project scenario
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	112
Justification of choice of data or description of	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood

measurement methods and procedures applied	
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	$EF_{p,i,nonCO2}$
Data unit	t CO ₂ e/TJ
Description	Non-CO ₂ emission factor for fuel used by baseline device type <i>i</i> in the project scenario
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	9.46
Justification of choice of data or description of measurement methods and procedures applied	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood
Purpose of Data	Calculation of project emissions
Comments	N/A

Data / Parameter	$NCV_{p,i}$
Data unit	TJ/tonne
Description	Net calorific value of project fuel used by project device type <i>i</i>
Source of data	Option 3: Default value from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	The value is determined ex ante by using of default values from the most recent version of the <i>IPCC Guidelines for National Greenhouse Gas Inventories</i> for wood
Purpose of Data	Calculation of project emissions
Comments	N/A

5.2 Data and Parameters Monitored

Data / Parameter	$N_{j,k,y}$
Data unit	Monitoring
Description	Number of commissioned project devices of type j from batch k in year y
Source of data	Project database
Description of measurement methods and procedures to be applied	The following data must be recorded during project activity implementation: 1) Number of new devices distributed under the project activity, identified by the type of device and date of commissioning; and 2) Identification information of the recipient of the device distributed under the project. Data management and reporting of this information must adhere to both data privacy requirements and good practice.
Frequency of monitoring/recording	Every time that new project devices are distributed
Value applied	800,000
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	-
Purpose of data	Calculation of baseline and project emissions
Calculation method	-
Comments	The number of project devices must be recorded in a database, sales record, or similar to ensure transparency

Data / Parameter	$n_{j,k,y}$
Data unit	Fraction
Description	Proportion of commissioned project devices of type j from batch k that are still being used regularly in year y
Source of data	Monitoring
Description of measurement methods and procedures to be applied	Option 2 (surveys): Based on an adoption rate determined by a survey according to the most recent version of the CDM Standard for Sampling and Surveys for Project Activities and Programmes of Activities and achieving 90/10 confidence precision for the proportion of devices in operation. The lower end of the 90%

	confidence interval must be used to ensure conservativeness. The adoption survey must include: a) Kitchen observation (which includes visual and physical checks of the stove and its components), including photographic evidence; and b) Interview with the primary cook. The project proponent must provide proof of training and supervision to ensure field teams have the capacity required to complete adoption surveys successfully.
Frequency of monitoring/recording	Annually
Value applied	-
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	Where the project device is not working or not being used at the time of conducting the survey, it should be conservatively assumed that the project device has not been active since the date on which the last adoption survey was conducted.
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of woody biomass that is established to be non-renewable used by device in year y
Source of data	Default value of the most recent version of CDM TOOL33
Description of measurement methods and procedures to be applied	See "Source of data"
Frequency of monitoring/recording	Ex-ante for each crediting period
Value applied	0.3
Monitoring equipment	N/A

QA/QC procedures to be applied	N/A
Purpose of data	Calculation of baseline and project emissions
Calculation method	N/A
Comments	N/A

Data / Parameter	$BC_{b,i,y}$
Data unit	Tonnes
Description	Fuel used per baseline device type i during year y
Source of data	This project has determined value of this parameter during current requantification and methodology update through a KPT survey in line with option 1 of applied methodology as mentioned below. And the same approach shall be followed in all future monitoring. Option 1: A measurement campaign following the <i>Kitchen Performance Test Protocol</i> in control households that do not participate in the project, established prior to validation as statistically equivalent to the pre-project conditions of project households regarding baseline fuel consumption
Description of measurement methods and procedures to be applied	Follow-up baseline surveys must be conducted at most every five years from the date of the last survey in control households that do not participate in the project, established prior to validation as statistically equivalent to the preproject conditions of project households regarding baseline fuel consumption. Measurement campaign must be updated where follow-up baseline surveys show that the fuels, fuel sources, or technologies used by the control group are no longer statistically equivalent to the pre-project conditions of project households. The measurement campaign must be designed, carried out, and analyzed in compliance with the most recent version of the <i>CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities</i>. The result must be scaled appropriately using the average household size to obtain the value of $BC_{b,i,y}$.
Frequency of monitoring/recording	At most every five years from the date of the last survey
Value applied	3.5696
Monitoring equipment	Based on <i>KPT method</i> , the equipment need to be calibrated every year is weighing scale and moisture content meters.

Weighing scale:

Calibrated frequency: Annual

Calibrated by Intertek

Type: ELECTRONIC BALANCE

1. Serial number: SI-001

Manufacture: DAHONGYING

Capacity: 40 kg x 5g

Accuracy class: +/- 5 g

Ambient Temperature: 22 ± 2 °C

Relative humidity: 62 ± 4 % RH

Calibration Certificate No.: KHMTT25002267, dated 06-January-2025

Due date: 06-January-2026

2. Serial number: SI-002

Manufacture: DAHONGYING

Capacity: 40 kg x 5g

Accuracy class: +/- 5 g

Ambient Temperature: 22 ± 2 °C

Relative humidity: 62 ± 4 % RH

Calibration Certificate No.: KHMTT25002269, dated 06-January-2025

Due date: 06-January-2026

Moisture content meters:

Calibrated frequency: Annual

Calibrated by VMI

Type: Laser liner

1. Serial number: 18042925

Manufacturer: Dampfinder compact

Accuracy class: 0.1%

Calibration Certificate No.: V06.CN5.177.26, dated 15-April-2024

Due date: 30-April-2025

2. Serial number: 18042926

Manufacturer: Dampfinder compact

Accuracy class: 0.1%

Calibration Certificate No.: V06.CN5.177.27, dated 15-April-2024

Due date: 30-April-2025

QA/QC procedures to be applied

The campaign must achieve a confidence and precision of 95/10 for the target parameter of average daily fuel consumption per adult equivalent. Where the project does not achieve the target precision in a monitoring period, the project proponent must apply an appropriate conservativeness deduction as per Section 4 of the most recent version of the *CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities*.

Comparison with the published literature

According to emission reduction methodology, utilizing a lower baseline consumption value considered a conservative approach. This practice ensures that the calculated emission reductions are not overstate.

Referring to the research paper under an international journal released in 2018, per capital consumption in Cambodia was 760 kg/capita/year¹⁴. End-users who are participated in the project activity are near-poor and poor households in rural with household size at 4.7 people/household¹⁵. Hence, quantity of firewood consumption is estimated at $760 \times 4.7 / 1000 = 3.57$ tonnes/household/year.

Also, according to a public research released in 2024, firewood is Cambodia's primary energy source, particularly in rural areas and among the poor. As of 2022, two million households used firewood for cooking¹⁶. Besides, reference is made to a project that has already been issued credits under the UNFCCC platform, with the project number PoA 10030, issued in 2020. The component project activity 10030-P1-0004-CP1, implemented in Cambodia, was registered under the methodology AMS II.G approved by the UNFCCC¹⁷. According to the project report, the amount of firewood saved through the use of the project stove is 3 tonnes/household/year, while the firewood consumption of the project stove is reported as 1.118 tonnes/household/year. Accordingly, the baseline stove consumption can be estimated at 4.118 tonnes/household/year.

¹⁴ Differences in consumption rates and patterns between firewood and charcoal: A case study in a rural area of Yedashe Township, Myanmar by Zar Chi Win et al. dated 2018; <https://doi.org/10.1016/j.biombioe.2017.12.011>

¹⁵ <https://www.eria.org/uploads/LPG-Supply-Master-Plan-for-Cambodia.pdf>

¹⁶ <https://www.ebsco.com/research-starters/environmental-sciences/cambodias-natural-resources>

¹⁷ <https://cdm.unfccc.int/UserManagement/FileStorage/AOIR2UGTELHMZCB9DQXS4FVOK183Y5>

	In the other project on Verra platform with project ID 3116 issued in 2024¹⁸, quantity of woody biomass used by project devices is 1.09 tonnes/household/year, the amount of firewood saved by the project cookstove is 2.47 tonnes/household/year. Hence, the baseline stove is calculated at 3.56 tonnes/households/year. Based on a comparative analysis of published study and existing project data with the region as above, the value determined by KPT survey of PP to calculate emission reductions is deemed highly conservative.
Purpose of data	Calculation of baseline emissions
Calculation method	N/A
Comments	The last survey for this parameter was also the first one conducted from 07-January-2025 to 11-February-2025. The next survey would be completed no later than 10-February-2030.

Data / Parameter	$\eta_{\text{new,avg},y}$
Data unit	Fraction
Description	Weighted average efficiency of project devices in year y
Source of data	Calculation
Description of measurement methods and procedures to be applied	Certification from the host country's national standards body or certifying agency. The decrease in thermal efficiency of project device j from batch k due to aging must be accounted for during the monitoring period. The project devices using biomass, PP has chosen A linear decrease approach, applying a default schedule of linearly decreasing efficiency up to the terminal efficiency (assumed to be 25%) through the lifespan of the project device
Frequency of monitoring/recording	Annually

¹⁸ <https://registry.verra.org/app/projectDetail/VCS/3116>

Value applied	<table> <tr> <th>Age</th><th>$\eta_{\text{new,avg},y}$</th></tr> <tr><td>1</td><td>0.3777</td></tr> <tr><td>2</td><td>0.3642</td></tr> <tr><td>3</td><td>0.3508</td></tr> <tr><td>4</td><td>0.3374</td></tr> <tr><td>5</td><td>0.3239</td></tr> <tr><td>6</td><td>0.3105</td></tr> <tr><td>7</td><td>0.2970</td></tr> <tr><td>8</td><td>0.2836</td></tr> <tr><td>9</td><td>0.2702</td></tr> <tr><td>10</td><td>0.2567</td></tr> </table>	Age	$\eta_{\text{new,avg},y}$	1	0.3777	2	0.3642	3	0.3508	4	0.3374	5	0.3239	6	0.3105	7	0.2970	8	0.2836	9	0.2702	10	0.2567
Age	$\eta_{\text{new,avg},y}$																						
1	0.3777																						
2	0.3642																						
3	0.3508																						
4	0.3374																						
5	0.3239																						
6	0.3105																						
7	0.2970																						
8	0.2836																						
9	0.2702																						
10	0.2567																						
Monitoring equipment	N/A																						
QA/QC procedures to be applied	N/A																						
Purpose of data	Calculation of baseline and project emission																						
Calculation method	N/A																						
Comments	N/A																						

Data / Parameter	$BC_{p,j,k,y}$
Data unit	Tonnes
Description	Average quantity of fuel used by project device type j from batch k during year y
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	This project has determined value of this parameter during current requantification and methodology update through a KPT survey in line with option 1 of applied methodology as mentioned below. And the same approach shall be followed in all future monitoring. Option 1: A measurement campaign following the Kitchen Performance Test protocol must be designed, carried out, and analyzed in compliance with the most recent version of the CDM Standard for Sampling and Surveys for CDM Project Activities and Programmes of Activities. The campaign must achieve confidence

	and precision of at least 90/10 for the target parameter of average daily fuel consumption per adult equivalent. The result must be scaled appropriately using the average household size to obtain the value of $BC_{p,j,k,y}$. Project activities applying KPTs must also measure the quantity of fuel used by pre-project devices that are still operational and provide it in the calculation sheet and monitoring reports (this is a reporting-only requirement).
Frequency of monitoring/recording	Annually
Value applied	1.4127
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	Refer to the study of Chan Somanta, the average households' fuelwood consumption for cooking is 3.23 ± 0.30 ($\pm$ refers to 90% of confidence level), 3.73 ± 0.23, and 4.83 ± 0.50 kg day⁻¹ household⁻¹ for small, medium, and large families, respectively. This study was conducted in Cambodia with sampling is households who were using the improved cookstove¹⁹. Findings in this study were similar to that found by San et al, average fuelwood consumption for cooking and boiling water per family per day is 5.21 ± 0.11 kg and 2.82 ± 0.11 kg respectively²⁰. Compare to the parameter $BC_{p,j,k,y}$ that has been determined by PP is 3.87 kg/day for device in the first year, this value does not exceed the public references listed above.
Purpose of data	Calculation of project emissions
Calculation method	N/A
Comments	At the time of requantification, the PP also conducted the 4th monitoring for the project. Therefore, this parameter was determined through the KPT survey. Since this is an estimated ER for the PD, the PP applied the value of this parameter for stoves aged one year. Details of the survey are provided in the ER sheet.

5.3 Monitoring Plan

(a) Sampling Methodology

¹⁹ https://u-hyogo.repo.nii.ac.jp/record/305/files/Dr_39a.pdf

²⁰ <https://www.sciencedirect.com/science/article/abs/pii/S0360544212004768>

Representative sampling will be undertaken that is designed in line with the requirements of the VM 0050 methodology applied and the “Standard for sampling and surveys for CDM project activities and programme of activities”, version 09.0. This sampling plan follows the recommended outline as contained in “Guidelines for sampling and surveys for CDM project activities and programme of activities”, version 04.0.

Monitoring Parameters

Parameter	Description	Type of parameter	Parameter type /frequency	Methods to be applied
$N_{j,k,y}$	Number of commissioned project devices of type j from batch k in year y	Mean value	Every time that new project devices are distributed	Visiting to the premises, visual inspection and interview with ICS end-user
$n_{j,k,y}$	Proportion of commissioned project devices of type j from batch k that are still being used regularly in year y	Proportion value	Annually	Visiting to the premises, visual inspection and interview with ICS end-user
$BC_{b,i,y}$	Fuel used per baseline device type i during year y	Mean value	At most every five years from the date of the last survey	Visiting to the premises, visual inspection, interview with household representative and weigh firewood
$BC_{p,j,k,y}$	Average quantity of fuel used by project device type j from batch k during year y	Mean value	Annually	Visiting to the premises, visual inspection, interview with ICS end-user and weigh firewood

To monitor the required parameters data will be collected from a statistically valid sample of ICS 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 in the above section. Data will be collected from the field surveys, entered in the database and included in the monitoring report.

As per approved methodology, the following guidance is being used for the representative sampling method:

“A statistically valid sample of the locations where the devices are deployed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine parameter values used to calculate emission reductions, as per the relevant requirements for sampling in the “Standard for sampling and surveys for CDM project activities and programmes of activities”. When biennial inspection is chosen a 95 per cent confidence interval and a 10 per cent margin of error shall be achieved for the sampling parameter. On the other hand, when the project proponent chooses to inspect annually, a 90 per cent confidence interval and a 10 per cent margin of error shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision are not achieved, the lower bound of the 90 per cent or 95 per cent confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision.”

Sample size will be chosen for a 95/10 precision (95% confidence interval and 10% margin of error); in cases where survey results indicate that 95/10 precision is not achieved, the lower bound of a 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve a 95/10 precision.

As per “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 09, the following Sampling plan has been developed:

As per para 3 of “Standard: Sampling and Surveys for CDM project activities and programme of activities”, version 09” The general requirements of sampling methods shall be applicable to PoAs with any requirement specified in the applicable methodologies having precedence”.

As per approved methodology, the following guidance is being used for the representative sampling method:

“When biennial inspection is chosen a 95% confidence interval and a 10% margin of error shall be achieved for the sampling parameter. On the other hand, when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision are not achieved, the lower bound of the 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision.”

Additional requirement for grouped project as per sampling standard, version 09, para 21 to 23, EB 110 will be followed:

In case a single sampling plan for more than one instance is used, “parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the instance project activity included in the grouped project except when a single sampling plan covering a grouped project is undertaken applying 95/10 confidence/precision for the sample size calculation”.

(b) Sample Frame

For parameter $N_{j,k,y}$, $n_{j,k,y}$, $BC_{p,j,k,y}$: The sampling frame refers to all the information in the database. The grouped project is open to different instance Implementers and different models of ICS. As explained below, to take the different characteristics of ICS models and other factors that may affect estimates into consideration, type of ICSs shall be either sampled separately and independently, or grouped together under a single sampling plan across the age and model of ICS, in each case using strata that have unique combinations of these factors.

For parameter $BC_{b,i,y}$: PP selected a control household group as statistically equivalent to the pre-project conditions of project households.

(i) Target Population

For parameter $N_{j,k,y}$, $n_{j,k,y}$, $BC_{p,j,k,y}$: The overall target population is the ICS distributed. The ICS to be sampled will be drawn from the list of individual ICS serial ID numbers contained in the sales record database, which is maintained by the distributor.

For parameter $BC_{b,i,y}$: The overall target population is the control household group. Each household is numbered separately in the data file.

(ii) Sampling method

For parameter $N_{j,k,y}$, $n_{j,k,y}$, $BC_{p,j,k,y}$: 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. Activities when sampling techniques or statistical analysis necessitates it.

For parameter $BC_{b,i,y}$: Sampling will be conducted using sample 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. Activities when sampling techniques or statistical analysis necessitates it.

(iii) 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.

In order to calculate the required sample size estimates, values for the proportions, mean values, and standard deviations are required. As per Guidelines for Sampling and surveys for CDM project activities and programmes of activities (version 04.0) Appendix 1 paragraph 5, there are different ways available to obtain the estimates of the parameter of interest:

- (a) Refer to the result of previous studies and use these results;
- (b) In a situation where information from previous studies is not available, a preliminary sample as a pilot could be conducted and use that sample is used to provide the estimates;
- (c) Use best guesses based on the researcher's own experiences.

For the registration/inclusion purpose of instance, option C shall be applied. 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:

- (a) A percentage – the proportion value
- (b) A numeric value – the mean value

For all of the parameters 95% confidence is required that the margin of error in the estimate is not more than $\pm 10\%$ in relative terms.

For a percentage – the proportion value

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

Where:

- N : Sample size
- $N=N_y$: Number of ICS in the instance project activity installed in year y = total number of households.
- p : Our expected proportion ([proportion] assuming [proportion] of the installed (ICS) 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).

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

For a numeric value –the mean value

The following equation is used:

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

Where: $V = (SD/\text{mean})^2$

n = Sample size

N = Population size

Mean= Expected mean

SD = Expected standard deviation

1.96 = Represents the 95% confidence required

(In the case of 90% confidence, 1.645 shall be used)

0.1 = Represents the 10% relative precision

Sample size determination for baseline survey

For mean value – Fuel used per baseline cookstove

For this parameter, the baseline survey is conducted at grouped project level, so 95/10 level of confidence and precision are applied for determining sample size. Based on the requirement of methodology VM 0050, PP chooses option 1 as mentioned in section 5.2 for the parameter table in “source of data”: Follow-up baseline surveys must be conducted every five years in control households that do not participate in the project, established prior to validation as statistically equivalent to the preproject conditions of project households regarding baseline fuel consumption. 1,000 households selected by PP and CWPD to be control household with criteria of selecting these HHs are mentioned in section 3.4 of the document. Hence, population size, N is taken as 1,000 households.

The expected mean of fuel used per baseline cookstove is 10 kg per day and its standard deviation is 1.

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

$$n \geq \frac{1.96^2 \times 1,000 \times (1/10)^2}{(1,000 - 1) \times 0.1^2 + 1.96^2 \times (1/10)}$$

$$n \geq 3.7$$

Monitoring Parameter	BC _{b,i,y}			
Sampling frame(s)	Given stove model			
Sampling approach	Simple random sampling			
Type of cookstove	Stove population	Expected Mean	Expected Standard Deviation	Calculated Sample Size
Traditional cookstove	1,000	10	1	11
Sample size determination				
Mean				10
Standard Deviation (SD)				1
$V_{\text{mean}} = (SD/\text{mean})^2$				0.01
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 14 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 11.

(iv) Survey and Data Collection Method

The sample to be surveyed will be drawn randomly with a geographical spread within the project boundary of the project activity instance

A survey will be conducted through: physical on-site visit (face-to-face). For the physical on-site visit (face-to-face interview), data is collected through hard-copy questionnaires.

Training

The project proponent will conduct a training programme for project participant's representative and its nominated distributor or third party surveyor for survey framework and approach. Major focus will be on understanding collection of data as per the survey questionnaire.

Data Collection

The survey team will collect the data as per the sampling method.

Data entry and storage

Level of supervision and guidance provided to staff, for example written instructions; The standardized system used to initially enter data into a computer and produce a final dataset, documenting steps taken to minimize the introduction of errors. There will be Systems in place to ensure all collected data is processed.

The type of quality checks performed on data entered, for example range checks, inconsistency checks, checking of subsamples of data by supervisors will be done. Clear guidelines will be done on How errors are recorded, reported and the remedial action taken. Level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion will be done.

Data Analysis

The data will be analysed for consolidation of findings.

The data from the survey will be analyzed.

- To determine number of project ICS that are still in operation
- Fuel used per baseline device type i during year y
- Average quantity of fuel used by project device type j from batch k during year y

Report generation.

A report will be prepared. The report should contain explicit statements, explanations or content related to the following: (a) A suitable qualification of the data analyst; (b) The statistical design of the survey, justification of its choice and the sample size used; (c) The statistical methods employed to analyse the data and reasons for choosing these methods, which should cite official or industry guidelines or other references where appropriate.

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 proponent in conjecture with the project proponent. The project proponent will undertake the efficiency tests for the representative samples of ICS installed and in operation as per the requirement of methodology.

During the survey, in order to anticipate any low response rate and answers bias, 10% will be applied over the determined sample size. The survey team will ensure that all questionnaires are. To remedy the incomplete questionnaires, additional households/users 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.

Analysis

The data from the survey will be analysed

Determine the mean value of the efficiency of the ICS that are still operating

To determine number of project ICS that are still in operation

Implementation plan

Survey Implementation Schedule:

The survey for collecting the details of the number of ICS in operation will be conducted annually and will be scheduled during the last month of the monitoring period. If the time period between surveys should exceed 2 years, then no emission reductions shall be claimed for such 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 in conjunction with the project proponent.

(c) Organizational Structure

Person	Role
PP database administrator	The database administrator is responsible for updating and maintaining all electronic databases.
Monitoring team	The monitoring team will be assigned by the PP to conduct the user interviews and check the operational status of Cookstoves (ICS) in households during the periodic sampling and reports the results to the database administrator. The skills and experience required for the data collection activities include: • Experience conducting surveys/test • Experience conducting door-to-door surveys • Local language skills (especially important for input to questionnaire design and interviewing of end users) • English language skills • Cultural awareness • Numerical proficiency • Data entry skills

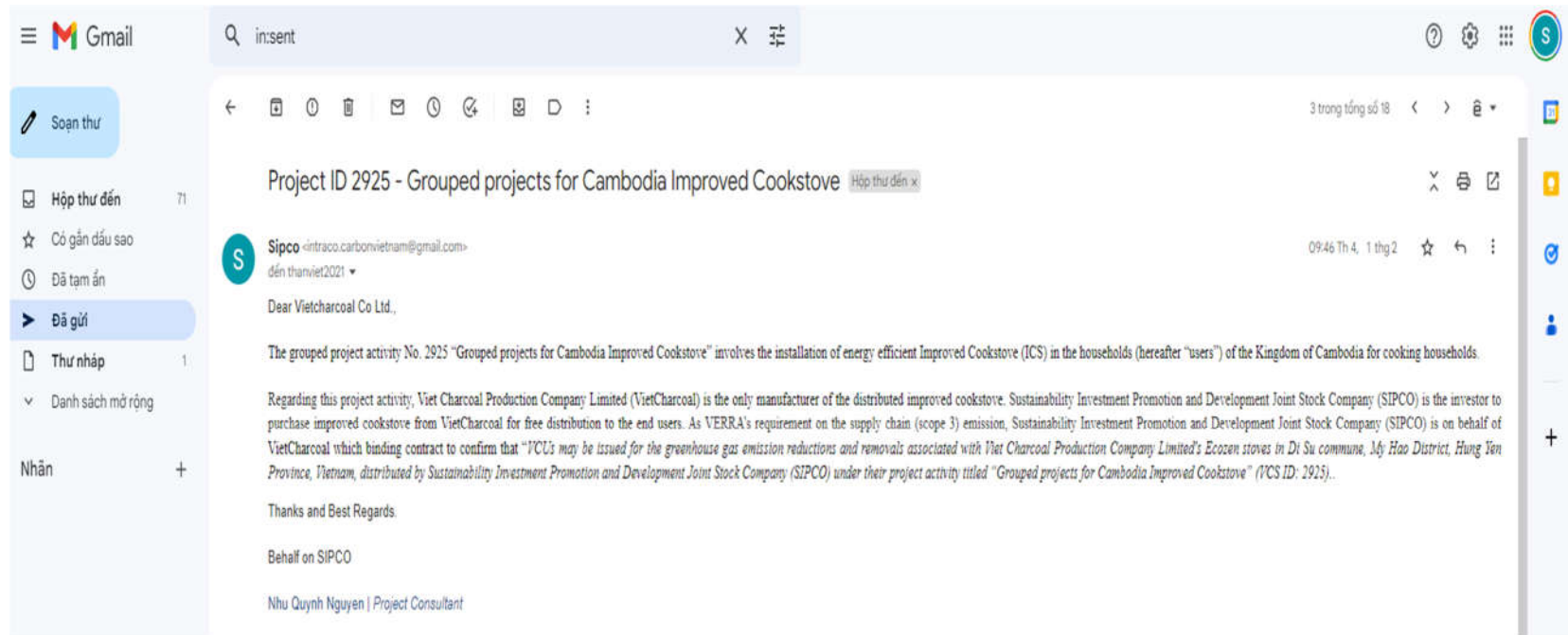
APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Not applicable.

Section	Information	Justification

APPENDIX 2: SUPPLY CHAIN (SCOPE 3)

1. Email of SIPCO sent to Viet Charcoal about supply chain



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

<https://intracocarbon.com/public-announcement-on-grouped-projects-for-cambodia-improved-cookstove-id-2925>



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THỊNH NGUYỄN - FEB 01, 2023

The grouped project activity No. 2925 "Grouped projects for Cambodia Improved Cookstove" involves the installation of energy efficient Improved Cookstove (ICS) in the households (hereafter "users") of the Kingdom of Cambodia for cooking households. For this reason, this proposed project activity aims at reducing the woodfuel consumption of traditional stove users by distributing ICS to households. By reducing the consumption of woodfuel, it can contribute to improving public health problems. Furthermore, this proposed project can contribute to Cambodia's climate change respond and sustainable development.

Regarding this project activity, Viet Charcoal Production Company Limited (VietCharcoal) is the only manufacturer of the distributed improved cookstove. Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) is the investor to purchase improved cookstove from VietCharcoal for free distribution to the end users. As VERRA's requirement on the supply chain (scope 3) emission, Sustainability Investment Promotion and Development Joint Stock Company (SIPCO) is on behalf of VietCharcoal which binding contract to confirm that "VCUs may be issued for the greenhouse gas emission reductions and removals associated with Viet Charcoal Production Company Limited's Ecozen stoves 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 Cambodia Improved Cookstove" (VCS ID: 2925).




APPENDIX 3: QUESTIONNAIRE FOR THE BASELINE ASSESSMENT

1. For the old baseline survey

តារាងស្ទង់មតិ: គំរូ ស្ថានភាពបច្ចុប្បន្នអំពីវត្តមានស្តុកបំប៉ន

Survey format: Baseline fuel consumption pattern

1.1 ព័ត៌មានទូទៅ/General information

ឈ្មោះគម្រោង/Title of project activity	
ឈ្មោះអ្នកដែលបានស្ទង់មតិ/Name of Surveyor	
ថ្ងៃស្ទង់មតិ/ Date of survey	
ដំណាក់កាលស្ទង់មតិ/Period of measurements (for consumption rate)	

1.2 ព័ត៌មានមូលដ្ឋាននៃគ្រួសារ /Household profile

ឈ្មោះ/Name (តំណាងគ្រួសារ/Household representative)	
ទំហំគ្រួសារ/Household size (សរុបមនុស្សក្នុងគ្រួសារ/ Total number of people)	
- មនុស្សធំ/Adult	
- កុមារ/Children	
អាសយដ្ឋាន/Address	
លេខទូរស័ព្ទ/Phone number (បើមាន/if any)	

1.3 អ្នកណាខ្លះទទួលបានការថែទាំក្នុងគ្រួសារ?/Who takes care off the cooking in your family?

ស្រី/Women	
បុរស/Men	
ទាំងពីរ/Both	

1.4 ពិពណ៌នាប្រភេទឧបករណ៍ចម្អិនមុនពេលគម្រោងបានផ្សព្វផ្សាយ /Stove description prior to the project implementation

“ប្រភេទឧបករណ៍ចម្អិនប្រភេទប្រពៃណី(ប្រភេទឧបករណ៍ចម្អិនប្រពៃណីគ្មានប្រព័ន្ធបំប៉នខ្មៅ)”/“A three – stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or chimney”	
ប្រភេទផ្សេងៗ/Any other type of stove	

1.5 ការប្រើប្រាស់វត្ថុឧស្ម័នស្តុកបំប៉នមុនពេលគម្រោងបានផ្សព្វផ្សាយ /Household fuel consumption pattern prior to the project implementation

អ្នកចម្អិនប្រភេទឧស្ម័នស្តុកបំប៉នប្រចាំថ្ងៃ/How many meals do you cook a day?	ពេលវេលា/ថ្ងៃ / Meals/day
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1.5.1. ការប្រើប្រាស់វត្ថុឧស្ម័នស្តុកបំប៉ន/Usage of cooking

ស្តុកបំប៉នសម្រាប់ប្រើប្រាស់/Cooking household meals	
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ដាំទឹកក្ដៅ/Water boiling	
ដាំបាយស្រូវ/Rice wine	
ដាំបាយក្ដៅ/Bran	
ផ្សេងទៀត/Other	

1.5.2. វត្ថុឧស្ម័នស្តុកបំប៉ន/Fuel use for cooking

	មាន/អត់(Yes/no)	ចំនួនប្រើប្រាស់/Quantity of usage	ឯកតាគិត/Unit
អុសឆ្កែ/Charcoal			Kg/ខែ kg/month
ឈើ/Wood			Kg/ខែ kg/month
Gas/LPG			Kg/ខែ kg/month
ប្រេងកាត/Kerosene			Kg ឬ លីត្រ/ខែ Kg or liter/month
ថ្លង់ថ្នាំ/Coal			Kg/ខែ kg/month
អគ្គីសនី/Electricity			kWh/ខែ kWh/month
វត្ថុឧស្ម័នផ្សេងៗ/Other fuel (បកស្រាយ/explain)			

1.5.3 គ្រួសាររបស់អ្នកបានសម្របសម្រួលបែបណា?/How does your family obtain firewood?

1. ទិញ/Buy ត្រូវការទិញនេះ តើគ្រួសាររបស់អ្នកចំណាយអស់ប៉ុន្មានលុយដើម្បីទិញអុសឆ្កែមួយខែ? In this case, how much does your household spend on buying firewood per month?	
2. ប្រមូល/Collect ត្រូវការប្រមូលនេះ តើគ្រួសាររបស់អ្នកប្រមូលអុសឆ្កែប៉ុន្មានដងក្នុងមួយខែ? In this case, how often did your household collect firewood?	
3. រួមផ្សំនៃការទិញ/Combination of buying (.....%) and/collecting (.....%)	

អរគុណអ្នកដែលបានចូលរួមក្នុងការស្ទង់មតិ/Thanks for participating in the survey

2. For the control household survey

បន្ទះគ្រួសារពិភពគ្រួសារ
Baseline Fuel Consumption Pattern

1.1 ព័ត៌មានទូទៅ/General information

ឈ្មោះគម្រោង/Title of project activity	Grouped Projects for Cambodia Improved Cookstove
ឈ្មោះអ្នកដែលបានស្ទង់មតិ/Name of Surveyor	
ថ្ងៃស្ទង់មតិ/ Date of survey	
វិធីសាស្ត្រស្ទង់មតិ/Survey method	

1.2 ព័ត៌មានមូលដ្ឋាននៃគ្រួសារ /Household profile

ឈ្មោះ/Name (តំណាងគ្រួសារ /Household representative)	
(សរុបមនុស្សក្នុងគ្រួសារ/Total number of people)	
• ភេទស្រីលើសពី 14 ឆ្នាំ/Female over 14 years	
• ភេទប្រុស អាយុ 15-59 ឆ្នាំ/Male 15–59 years	
• ភេទប្រុស អាយុលើសពី 59 ឆ្នាំ/Male over 59 years	
• កុមារ 0-14 ឆ្នាំ/Children 0–14 years	
ប្រភេទតំបន់ (ទីក្រុង/ជនបទ)/Type of area (urban/rural)	
អាសយដ្ឋាន/Address	
លេខទូរស័ព្ទ/ Phone number (if any)	


1.3 ព័ត៌មាននាចង្ហាន់ចម្អិនម្ហូបពេលគម្រោងបានផ្សព្វផ្សាយ /Stove used for cooking

ភ្លើងចម្អិន ប្រភេទឧបករណ៍ដែលមិនមានការផ្គត់ផ្គង់ខ្យល់ចំហេះដែលប្រសើរឡើង ប្រភេទឧបករណ៍ឧស្ម័ន flue (ឧ. ដោយគ្មានកំដៅកំដៅ ឬបំពង់ផ្សេង)/A three-stone fire or a conventional system with no improved combustion air	
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supply nor flue gas ventilation system (i.e., without a grate or chimney)	
ចង្រានឆ្កែជាមូលដ្ឋាន/Basic charcoal stove	
ចង្រានឥន្ធនៈដែលកែលម្អ/Improved woodfuel cookstove	
ចង្រានឆ្កែដែលបានកែលម្អ/Improved charcoal cookstove	
ចង្រាន LPG /LPG cookstove	
ចង្រានអគ្គីសនី/Electric cookstove	
ផ្សេងទៀត (ពិពណ៌នា)/Other (describe)	

1.4 ការប្រើប្រាស់ឥន្ធនៈសម្រាប់ឧបករណ៍សម្រួលពេលកម្រោងបានផ្សព្វផ្សាយ /Household fuel consumption pattern

តើអ្នកបានរៀបចំអាហារប៉ុន្មានថ្ងៃហើយ?/How many meals did you prepare yesterday? តើនេះជាតម្លៃធម្មតាទេ?/Is this a typical value? ប្រសិនបើចម្លើយគឺ “ទេ” តើអាហារប៉ុន្មានមុខត្រូវបានរៀបចំក្នុងមួយថ្ងៃ?/If the answer is “No,” how many meals are prepared in a typical day?	
តើមានភាពខុសគ្នាជាមួយនឹងបរិមាណអាហារដែលបានរៀបចំក្នុងអំឡុងពេលថ្ងៃចុងសប្តាហ៍ធម្មតាដែរឬទេ?/Is there any difference with the amount of meals prepared during a typical weekend day?	
ពិពណ៌នាអំពីវិធីផ្សេងទៀតដែលអ្នកបានប្រើចង្រានរបស់អ្នកកាលពីសប្តាហ៍មុន (ឧ. ការស្ទោកស្ទោកសម្រាប់ផឹក ការដាំទឹកសម្រាប់អនាម័យ កំដៅលំហ)/Describe any other ways in which you used your stove last week (e.g., water boiling for drinking, water boiling for hygiene, space heating)	

1.4.1. វត្ថុធាតុសម្រាប់ឆេះ/Fuel use for cooking

	មាន/អត់ Yes/no	ចំនួនប្រើប្រាស់/ Quantity of usage	ឯកតាគិត/ Unit
អស់ឆ្នុង/Charcoal			Kg/ខែ kg/month
ឈើ/Wood			Kg/ខែ kg/month
Gas/LPG			Kg/ខែ kg/month
ប្រេងកាត/Kerosene			Kg ឬ លីត័រ/ខែ Kg or liter/month
ផ្កាស្ល/Coal			Kg/ខែ kg/month
អគ្គិសនី/Electricity			kWh/ខែ kWh/month
វត្ថុធាតុផ្សេង/Other fuel (បកស្រាយ/explain)			

1.4.2. បរិភពប្រភពឆេះ/Fuel sources?

	ការប្រមូល / ទិញ/Collection/Purchased	បរិភពប្រភពឆេះ/Source or location of fuel
អស់ឆ្នុង/Charcoal		
ឈើ/Wood		
Gas/LPG		
ប្រេងកាត/Kerosene		
ផ្កាស្ល/Coal		
អគ្គិសនី/Electricity		
វត្ថុធាតុផ្សេង/Other fuel (បកស្រាយ/explain)		