



DISTRIBUTION OF ENERGY EFFICIENT COOKSTOVE IN INDIA- 2

Document Prepared by

Greneity Infocom Service Pvt Ltd

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1 PROJECT DETAILS

1.1 Summary Description of the Project

A summary description of the technologies/measures to be implemented by the project.

The grouped project activity aims to replace the commonly used inefficient wood fired mud stove technology, with energy efficient cook stove, which is clean and sustainable. The project activity involves distribution of energy efficient cookstove to the rural population in India. The project will distribute ICS will be undertaken for households. It is intended that under this project high thermal efficient cook stoves will be distributed. The ICS distributed will burn wood more efficiently thereby improving thermal transfer to pots, hence saving fuel wood. This project will also halt the rapidly progressing deforestation in India but will also reduce health hazards from indoor smoke pollution and women and children will have to spend less time collecting firewood.

The target population is the rural population of India, those uses three stone fires cook stove and cannot afford these stoves, project participant has to heavily subsidize it or give it off free of cost. The end user will be informed in advance that the use of ICS generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs.

The location of the project.

The project location is various districts of Chhattisgarh, Bihar, Jharkhand, Uttar Pradesh, Kerala, Telangana and Odisha, states of India. The project implementation schedule provided below. The project location details, KML files for various states in India, will be provided in VCS MR at the time of project activity instance inclusion during verification of project activity.

Implementation Schedule:

Sl. No.	Location/State	Distribution of ICS in 2021	Distribution of ICS in 2022	Distribution of ICS in 2023
1.	Chhattisgarh	10,000	10,000	10,000
2.	Bihar	10,000	10,000	10,000
3.	Jharkhand	10,000	10,000	10,000
4.	Uttar Pradesh	10,000	10,000	10,000
5.	Kerala	10,000	10,000	10,000
6.	Telangana	10,000	10,000	10,000
7.	Odisha	10,000	10,000	10,000

An explanation of how the project is expected to generate GHG emission reductions or removals.

The ICS will additional the presently common cooking on open fire. The ICS burns wood more efficiently thereby improving thermal transfer to pots, hence saving fuel and lowering greenhouse gas emissions.

A brief description of the scenario existing prior to the implementation of the project.

The baseline scenario is the continued use of non-renewable wood fuel by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity.

An estimate of annual average and total GHG emission reductions and removals.

Presently grouped project activity is planned to be included with distribution of 10,000 ICS. The ICS number will vary during actual implementation and same will update during registration and verification of project activity. The average annual GHG emission reduction is 34,651 tCO₂e and total 346,515 tCO₂e for the group project activity over the entire crediting period.

1.2 Sectoral Scope and Project Type

The project is categorised under type/category as below:

Sectoral scope: 03 - Energy demand

Type: II – Energy efficiency improvement projects

The project is a grouped project.

1.3 Project Eligibility

The project involves energy efficient cookstove distribution 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 4.2, efficiency improvements in thermal applications (e.g., cook stoves) are not excluded, hence project is eligible under VCS.

1.4 Project Design

- ☐ The project includes a single location or installation only
- ☐ The project includes multiple locations or project activity instances, but is not being developed as a grouped project
- ☒ The project is a grouped project

Eligibility Criteria

For grouped projects, the eligibility criteria for the inclusion of new project activity instances

No.	Criterion	How the new project activity instances to comply
1	Meet the applicability conditions set out in the methodology applied to the project	New project activity instances (Energy Efficient Cook Stoves) will meet the applicability conditions set out in Section 3.2 below, where the target population is the household and the ICS deployed is at least 25% of thermal efficiency.
2	Use the technologies or measures specified in the project description.	The technology used for project activity is energy efficient cook stoves. Only energy efficient cook stoves to be adopted in the project by replacing traditional cook stoves in rural household.
3	Apply the technologies or measures in the same manner as specified in the project description.	Only energy efficient cook stoves to be adopted in the project by replacing traditional cook stoves in rural household.
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 at various districts of Chhattisgarh, Bihar, Jharkhand, Uttar Pradesh, Kerala, Telangana and Odisha, in India and subject to the same baseline scenario determined in Section 3.4 below.
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 be 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 energy efficient cook stoves for each 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.

1.5 Project Proponent

Organization name	Greneity Infocom Service Pvt Ltd
Contact person	Shivani Garg
Title	Managing Director
Address	Dilshad Garden, 137-B, Pocket-A, Delhi 110095
Telephone	+91-9886252062
Email	Shivani.garg@greneity.com

1.6 Other Entities Involved in the Project

Organization name	N/A
Role in the project	N/A
Contact person	N/A
Title	N/A
Address	N/A
Telephone	N/A
Email	N/A

1.7 Ownership

The project ownership is with Greneity Infocom Service Pvt Ltd.

The ICS are distributed to end uses (Housholds) at free of cost. The end user are informed in advance that the use of ICS generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs. The participating household will sign a

declaration to transfer the ownership rights of the carbon assets generated from this project to the Greneity Infocom Service Pvt Ltd, also undertaking is provided by Greneity Infocom Service Pvt Ltd for projects ownership. The undertaking from manufacturer and distributor and end user agreement has been submitted to confirm that cook stove ownership is with Greneity Infocom Service Pvt Ltd.

1.8 Project Start Date

05-June-2021 (The earliest date of commissioning date of ICS under this group project)

1.9 Project Crediting Period

First crediting period: 05-June-2021 to 04-June-2031, 10 years fixed crediting period.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated annual GHG emission reductions/removals of the project are:

- ☐ <20,000 tCO₂e/year
- ☒ 20,000 – 100,000 tCO₂e/year
- ☐ 100,001 – 1,000,000 tCO₂e/year
- ☐ >1,000,000 tCO₂e/year

Project Scale	
Project	X
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	65,908
Year 2	58,428
Year 3	51,154
Year 4	44,082

Year 5	37,209
Year 6	30,533
Year 7	24,051
Year 8	17,759
Year 9	11,655
Year 10	5,736
Total estimated ERs	346,515
Total number of crediting years	10
Average annual ERs	34,651

The above ER estimation is with consideration of 10,000 cook stoves and with 365 days per year with conservative 10% annual loss or non-operation of ICS assumption. The average lifetime of cook stove is 10 years, but it may expect that cook stove will be in operation beyond 10 years also. Thus, above ER estimation is determined considering the 10 years of operation.

1.11 Description of the Project Activity

The project activity aims to replace the commonly used inefficient wood fired mud stove technology, with energy efficient cook stove, which is clean and sustainable. The project activity involves distribution of energy efficient cookstove to the rural population various districts of Chhattisgarh, Bihar, Jharkhand, Uttar Pradesh, Kerala, Telangana and Odisha, states, India. The project will distribute ICS will be undertaken for households. It is intended that under this project high thermal efficient cook stoves will be distributed. The ICS distributed will burn wood more efficiently thereby improving thermal transfer to pots, hence saving fuel wood. This project will also halt the rapidly progressing deforestation in India but will also reduce health hazards from indoor smoke pollution and women and children will have to spend less time collecting firewood.

The target population is the rural population of India, those uses three stone fires cook stove and cannot afford these stoves, project participant has to heavily subsidize it or give it off free of cost. The end user will be informed in advance that the use of ICS generates carbon finance which in turn is used to cover the price of ICS and for recovering project implementation costs.

The project activity cook stoves are with different manufacturers and specifications of cook stoves will be provided during validation/verification or during inclusion of project activity instances.

Technical Specifications of Cook Stoves for initial project activity instance from Manufacturer

TECHNICAL DETAILS

Cook Stove Type/Category	Improved chulla
	Natural Draft
Expected life of stove	10 Years
Guarantee /Warranty Period	1 Years
Thermal Efficiency	31.95%

S No	Part / Inputs	Materials used	Thickness (in mm)	Details of electric appliances/others*
1	Top Plate	Mild Steel	1.6 mm thick	-----
2	Grate	Cast iron	8 mm thick	-----
3	Pot Stand	Mild Steel	2 mm thick	-----
3	Barrel/Combustion Chamber Mild steel, ceramics, Pottery/Clay etc.)	Outer Barrel Inner Chamber Outer Cone Inner Cone (All material) Mild Steel	1.6 mm thick 1.6 mm thick 1.2 mm thick 2 mm thick 5 mm hole	Ours is a seven layer technology - • Air Curtain Insulation – 1.6 mm thick • Outer Shell MS Sheet – 1.6 mm thick • Ceramic Blanket – 12 mm thick • Inner shell MS – 1.6 mm thick • Hot Air Chamber – 36 mm • Outer cone Mild Steel - 1.6 mm thick • Inner cone Mild Steel (Perforated Sheet) - 2.0 mm thick (Burning Chamber)
4	Bottom Plate	Mild Steel	1.6 mm	
5	Perforated Sleeve Mild Steel	Inner cone Burning Chamber	2 mm thick 5 mm hole	
6	Insulation	Ceramic Blanket (1800 degree)	12 mm thick	
7	Long Handles	Insulated		
8	Height			290 mm
9	Diameter			240 mm
10	Weight of Stove			~ 8 - 10 KG
11	Accessories			Ash Tray, Cleaning Stick, operating knob, Operating Manuals and Warranty Card

The manufacturer may change for future project activity instances and same will be transparently reflect during verification. The details and specifications of respective cook stoves will be considered for ER calculation of project activity instance.

Data collection of ICS end-user

Project proponent must gather the necessary information to identify households using its ICS during the course of the project. To facilitate this process, each ICS will be assigned a unique serial number. This number will be recorded during the registration process together with the following information (as appropriate and as available):

- Name of ICS user or head of the household
- Address/ Village name of ICS household
- Stove model Distributed
- Date of distribution/installation
- ICS serial number
- Retailer/distributor/Manufacturer information

The information collected will be stored in the electronic database excel sheet which will serve as project database for project monitoring and sampling purposes. The traditional cook stoves were operational and this was the scenario prior to the implementation of project.

1.12 Project Location

All the project activity instances in the proposed grouped project activity would be located within geographical boundaries of India

For initial project activity instance, geographical area is in various districts of Chhattisgarh, Bihar, Jharkhand, Uttar Pradesh, Kerala, Telangana and Odisha, states of India.

The geographical boundary for projects located in India is delineated in the form of extreme geographic coordinates of India as follows:

Latitude - 26.846708° N

Longitude - 80.946159° E¹



¹ <https://en.wikipedia.org/wiki/UttarPradesh>

1.13 Conditions Prior to Project Initiation

The conditions prior to project initiation is the continued use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity. The project aims to reduce the environmental and social burdens caused by inefficient biomass cooking by introducing energy efficient wood and charcoal stoves to low- income households.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

There are no laws and regulations governing the use of improved cookstoves in India for households. The project is a voluntary effort by the project proponent. Though, the government of India promotes use of clean fuel e.g. LPG, however due to the initial capital cost and operating cost, the usage levels are low and most of the rural households still use traditional stoves for cooking. There is no specific concern made on improved cookstoves project from the above laws and regulations.

1.15 Participation under Other GHG Programs

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

The project has not been registered, nor is it seeking registration under any other GHG program.

1.15.2 Projects Rejected by Other GHG Programs

The project has not been rejected by any other GHG program.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

Does the project reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading?

☐ Yes

☒ No

The project is not included in an emissions trading program or any other mechanism that includes GHG allowance trading. The undertaking is submitted for same.

1.16.2 Other Forms of Environmental Credit

Has the project sought or received another form of GHG-related credit, including renewable energy certificates?

☐ Yes☒ No

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The project contributes to social, environmental, economic and technological benefits which contribute to sustainable development of the local environment and the country as follows:

Social benefits

Reduces drudgery to women (due to reduced fuel wood use) who spend long hours and travel long distances to collect fuel wood.

Improves overall health of women and children by reducing smoke in the kitchen, thus reducing health hazards from indoor air pollution.

Better cooking time – the materials used in making the ICS transmit the heat effectively, cooking the food faster.

Better cooking environment due to less smoke and carbon residue in the kitchen.

Better quality of life – the rural communities get family time as the whole family can sit and eat together.

Environmental benefits

Improves the local environment by reducing rate of degradation of forests and deforestation in the project area.

Reduce indoor pollution – ICS emits less smoke and reduces morbidity from respiratory diseases and other health hazards, as well as the medical expenditure involved. A resource-poor household would need to spend limited available finances on medicines, further exacerbated by loss of wages from both not being able to work and having to look after the ill-person.

Reduce global and local environmental pollution and environmental degradation by reduction in use of non-renewable biomass thus leading to reduction in GHG emissions.

Less water and effort is needed for cleaning vessels as the cooking process is relatively smoke free.

Economic benefits

- Employment opportunities for local communities through the CDM activity.
- Reduces purchase of fuel wood and/or wage equivalent from reduced firewood collection

time.

1.17.2 Sustainable Development Contributions Activity Monitoring

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
<i>Sequential row number</i>	<i>SDG Target number</i>	<i>Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator</i>	<i>Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)</i>	<i>Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.</i>	<i>Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.</i>
1)	13.0	Quantity of emission reductions achieved from the project activity.	Emission reductions	The project activity involves distribution of energy efficient cookstove to the rural population. The ICS distributed will burn wood more efficiently thereby improving thermal transfer to pots, hence saving fuel wood. The average annual GHG emission reduction is 34,651 tCO ₂ e	The average annual GHG emission reduction is 34,651 tCO ₂ e and total 346,515 tCO ₂ e for the group project activity over the entire crediting period.

2)	7.1	7.1- By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.2-Proportion of population with primary reliance on clean fuels and technology	Number of ICS operational under the project activity. PP will ensure that the biogas plants are operational and all the plants owners have the access to clean energy.	Number of ICS operational under the project activity. PP will ensure that the ICS are operational and all the ICS owners have the access to clean energy.
3)	8.5	8.5.2- Quality of Employment; and Quantitative employment and income generation.	Number of Training Programmes provided to the employees and the Maintenance & Service staff. Number of Employees for Maintenance & Service.	Provided training for improving employability. Thereby improving Quality of Employment. 2 training per year; minimum 10 employments.	A total of 20 training in project lifetime and maintaining minimum 10 employments throughout life time of the project activity.

1.18 Additional Information Relevant to the Project

Leakage Management

Not applicable as the project adopts a net gross adjustment factor of 95% to account for leakage.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description

Further Information

Not Applicable

2 SAFEGUARDS

2.1 No Net Harm

The project will only bring positive impacts on environmental and socio-economic aspects as elaborated in Section 1.17. No potential negative environmental or socio-economic impacts have been identified for the project, thus this section is not applicable.

2.2 Local Stakeholder Consultation

Greneity invited all the relevant stakeholders and the villagers for this meeting. The local stake holder consultation meeting was successfully held on 30/06/2021 at Rasra Village, Ballia, Uttar Pradesh.

The project idea and its components were thoroughly discussed, feedback from the participants has been documented and sustainable development aspects were discussed during the proceedings. Participants got clarification on many of the project aspects.

Mr. Arjun Sharma, explained about the programme and its implementation style. He stated that the present project is much useful to the local community in general and women in particular. Further, the positive impact on the women health by using the clean fuel technology is also explained.

Mr Sandeep Maurya, introduced the present project to the participants and clarified many of their queries. He also explained about the Carbon credits generated from the project activity. Further, explained how this Project activity is supporting the distribution of ICS plants to rural households and provide participating households with clean, convenient and efficient means for cooking and heating purposes. Also provided

insights on how the monitoring of ICS could lead to positive sustainable development goals.

They had distributed feedback forms among the participants and collected once they were duly filled.

The participants overwhelmingly supported the project and No negative comments were raised.

As a part of on-going communication with local stakeholders, end users will be informed about grievance register. The distributors will have the responsibility to take grievances regarding the project activity and same will be conveyed to PP during operation of project activity. Thus, ongoing communication of stakeholders will be followed through grievance mechanism. If any concerns received during operation of project activity, same will be addressed if relevant to project activity.

2.3 Environmental Impact

No negative environmental impacts have been identified from the project and environmental impact assessment (EIA) is not required for the project. In fact project activity supports positive environmental impacts.

2.4 Public Comments

This section will be completed after 30 days public comment period. It will be checked if there are any comments received during 30 days public comment period.

2.5 AFOLU-Specific Safeguards

This section is not applicable as the project is a non-AFOLU project

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

- VCS Methodology: VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version 1.1,

<https://verra.org/methodology/vmr0006-methodology-for-installation-of-high-efficiency-firewood-cookstoves/>

- This methodology also refers the latest version of AMS II.G version 12 - Energy efficiency measures in thermal applications of non-renewable biomass <https://cdm.unfccc.int/methodologies/DB/10PELMPDW951SVSW1B2NRCQE BAX96C>
- For calculation of fraction of non-renewable biomass, the below tool is used “TOOL30: Calculation of the fraction of non-renewable biomass” <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-30-v3.0.pdf>

3.2 Applicability of Methodology

The applicability of methodology is justified as below

Applicability criterion	How the project complies
Project activities shall be implemented in domestic premises or in community-based kitchen	The proposed project involves deployment of ICS only in households i.e domestic premises or in community-base kitchen. For first project activity instance, project activity is implemented in households.
The project stove shall have specified high-power thermal efficiency of at least 25% per the manufacturer’s specifications and shall exclusively use woody biomass and can be single pot or multi-pot;	Energy Efficient stoves planned to be installed under this project are single pot or multi pot portable or an in-situ wood cook stoves that have an efficiency more than 25%. For first project activity instance, efficiency of 31.95% cook stoves installed as per the manufacturer’s specifications. For future project activity instances, Manufacturer may change and that cook stove efficiency should be more than 25% as mentioned in methodology based on manufacturer specification. .
Both ‘Projects’ and ‘Large Projects’ can use the methodology	Each ICS is considered as a project activity instance will be Projects
Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics;	Non-renewable biomass has been used since 31 December 1989 in India as demonstrated at below by referring to published literature, official reports or statistics; For project activity instance to be located in other

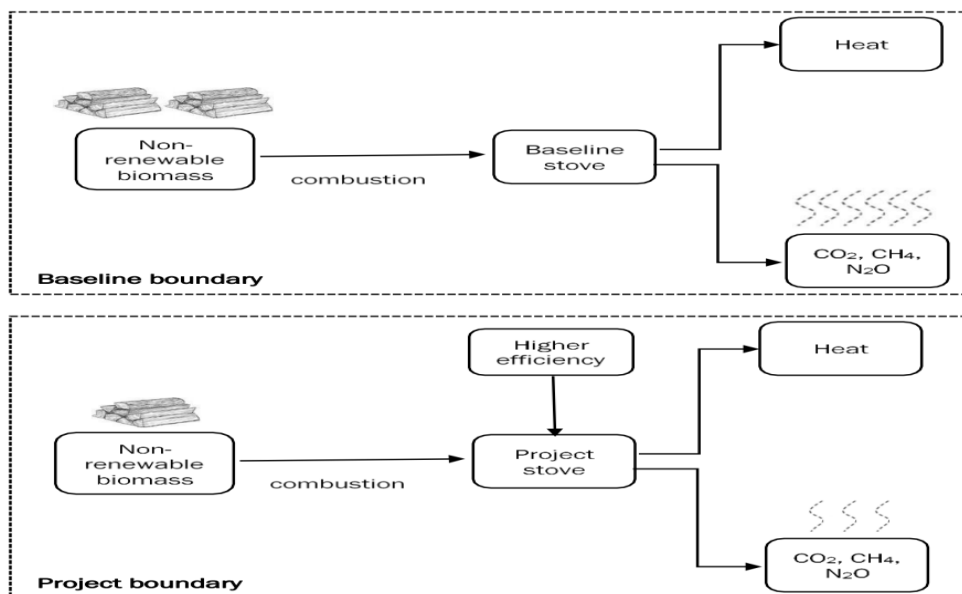
	country, the same will be justified at the time of project activity instance inclusion.
For the specific case of biomass residues processed as a fuel (e.g. briquettes, wood chips), it shall be demonstrated that: a. It is produced using exclusively renewable biomass (more than one type of biomass may be used) b. The consumption of the fuel should be monitored during the crediting period c. Energy use for renewable biomass processing (e.g. shredding and compacting in the case of briquetting)	Not applicable as project activity uses non-renewable biomass as a fuel. The ICS is introduced as energy efficiency measure to replace baseline stoves and reduce the use of non-renewable biomass for combustion.
The VCS PD shall explain the proposed method for distribution of project devices including the method to avoid double counting of emission reductions such as unique identifications of product and end-user locations (e.g. programme logo) The above criteria is as per below VCS meth requirement and para 7 of latest version of meth AMS II.G version 12 is followed. (Additionally, applicability criteria numbers 8 and 9 set out in Section 2.2 of AMS II.G, version 11.1 shall apply)	Each ICS have unique serial number, thus unique identification of product and end user is followed. The distributor has identified village representative to distribute the cook stove, make the installation data for baseline scenario and project activity details. The Project Owner have provided the undertaking that no double counting of emission reductions occurred due to unique identifications of product and end-user location.
The VCS PD shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices. The above criteria is as per below VCS meth	Manufacturers/ cook stove distributors undertaking to be provided that there is no any double accounting for carbon emissions associated with ICS supplied to households under the project activity having Project Owner (Greneity Infocom Service Pvt Ltd.) . Greneity will be owner of that carbon credits and

requirement and para 8 of latest version of meth AMS II.G version 12 is followed. (Additionally, applicability criteria numbers 8 and 9 set out in Section 2.2 of AMS II.G, version 11.1 shall apply)	Manufacturers/ cook stove distributors will not claim any credits for such cook stoves.
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3.3 Project Boundary

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

A representation of the baseline boundary and project boundary are given as below



3.4 Baseline Scenario

As per methodology “The baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs as provided by project cook stoves in absence of project activity.”

The project activity instances to be included in this grouped project activity should meet the baseline scenario as mentioned above. For first project activity instance, the baseline scenario is the continued use of non-renewable wood fuel (firewood) by the target population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity.

3.5 Additionality

The methodology uses activity method for the demonstration of additionality.

Activity Method

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 Greneity.

Step 2: Positive List

As per Section 3.2, the project meets the applicability conditions of the methodology which represent the positive list.

The project installs the ICS at zero cost to the household and has no other source of revenue other than the sale of GHG credits.

The project is not implemented as part of government schemes or supported by multilateral funds. Conclusion: As the project fulfills the conditions above, it is deemed additional.

If any project activity instance does not follow the positive list as stipulated by methodology, then additionality need to demonstrate as per tool requirement.

3.6 Methodology Deviations

The project did not apply any methodology deviations

4 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 4.4.

4.2 Project Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 4.4.

4.3 Leakage

Leakage shall be considered as default 0.95 in accordance with methodology.

4.4 Estimated Net GHG Emission Reductions and Removals

The improved cookstove is introduced as energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions

$$ER_y = \sum_i \sum_j ER_{y,i,j}$$

Where:

i	=	Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire. Same model will be used in each instance
j	=	Indices for the situation where there is more than one batch of improved cookstove of type i . Single batch stove will be used in each instance
ER_y	=	Emission reductions during year y in t CO ₂ e
$ER_{y,i,j}$	=	Emission reductions by improved cookstove of type i and batch j during year y in t CO ₂ e

$$ER_{y,,} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO2} + EF_{wf,non\ CO2}) \times N_{y,j} \times 0.95$$

Where:

$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j during year y
$f_{NRB,y}$	=	Fraction of woody biomass that can be established as non-renewable biomass (f_{NRB})
$NCV_{wood fuel}$	=	Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonnes)
$EF_{wf,CO2}$	=	CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO2/TJ)
$EF_{wf,non CO2}$	=	Non-CO2 emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO2/TJ) ⁸
$N_{y,i,j}$	=	Number of improved cookstoves of type i and batch j operating during year y
0.95	=	Discount factor to account for leakage

The quantify of woody biomass saved due to implementation of improved cookstoves to be estimated using equation below (Equation 4 of methodology)

$$B_{y,savings,i,j} = B_{y=1,new,i,survey} \times \left(\frac{\eta_{new,i,j}}{\eta_{old}} - 1 \right)$$

where

η_{old}	=	Efficiency of baseline cookstove
$\eta_{new,y,i,j}$	=	Efficiency of the improved cookstove type i and batch j determined through water boiling test (WBT) during year y Alternatively, efficiency may be determined using below Equation
$B_{y=1,new,i,j,survey}$	=	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j , determined in the first year of the implementation of the project through a sample survey.

$$\eta_{new,i,y} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

where

η_p	=	Efficiency of project stove (fraction) at the start of project activity.
----------	---	--

- $(DF_n)^{y-1}$ = Discount factor to account for efficiency loss of project cookstove per year of operation (fraction). This value may be based on actual monitoring or based on manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.
- 0.94 = Adjustment factor to account for uncertainty related to project cookstove efficiency test.

ER Estimation for Project Activity Instance :

For ex-ante calculation purpose, the assumption below is applied for first project activity instance.

- The group project install ICS 10,000 ICS initially.
- The end date of installation of project activity instance is considered as operational date of that project activity instance.
- The life span of ICS is 10 years; thus, the operational lifetime of each project activity instance is taken as 10 years. It can extend after proper repair and maintenance. The end users can repair the ICS through the service providers (PP representative) who will repair the cook stove for further use. After 10 years of lifetime, a report from Maintenance Company will be provided to confirm the extended life of cook stove.
- Each ICS will be considered as project activity instances as per the VCS standard. Annual stove loss rate is estimated at 10 %. This is assumed as conservative. During actual ER calculation, this value is varying. This value will vary during actual verification based on survey results.
- $B_{y=1, \text{ new, i, survey,}}$ is assumed as 1.83 tonnes / device / year.

Determination of number of ICS operating during year y

$$N_{y,i,j} = 10,000 \times [1 - (y-1) \times 10\%]$$

Example of calculation:

If $y = 2$,

$$N_{y,i,j} = 10,000 \times [1 - (2-1) \times 10\%]$$

$$= 10,000 \times 90\%$$

$$= 9,000$$

Hence, the number of ICS operating during year y is as below:

Year (y)	$N_{y,i,j}$
1	10,000
2	9000

3	8000
4	7000
5	6000
6	5000
7	4000
8	3000
9	2000
10	1000

Determination of efficiency of ICS during year y

$$\eta_{new,y,i,j} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

Where

$$\eta_p = 31.95\%$$

$$DF_n = 0.99$$

Example of calculation:

If y= 2

$$\begin{aligned} \eta_{new,y,i,j} &= 31.95\% \times (0.99)^{2-1} \times 0.94 \\ &= 29.73\% \end{aligned}$$

Hence the efficiency of ICS during year y is as below:

Year (y)	$\eta_{new,y,i,j}$
1	30.03%
2	29.73%
3	29.44%
4	29.14%
5	28.85%
6	28.56%
7	28.28%

8	27.99%
9	27.71%
10	27.44%

Determination of quantity of woody biomass that is saved in tonnes per ICS during year y

$$B_{y,savings,i,j} = B_{y=1,new,i,survey} \times \left(\frac{\eta_{new,i,j}}{\eta_{old}} - 1 \right)$$

Example of calculation: If y= 2,

$$B_{y,savings,i,j} = 1.83 \times [(0.2973/0.1) - 1]$$

$$= 3.60 \text{ tonnes}$$

Year (y)	$B_{y=1,new,i,survey}$	$\eta_{new,y,i,j}$	η_{old}	$B_{y,savings,i,j}$
1	1.83	30.03%	0.1	3.6560
2	1.83	29.73%	0.1	3.6012
3	1.83	29.44%	0.1	3.5470
4	1.83	29.14%	0.1	3.4932
5	1.83	28.85%	0.1	3.4400
6	1.83	28.56%	0.1	3.3874
7	1.83	28.28%	0.1	3.3353
8	1.83	27.99%	0.1	3.2837
9	1.83	27.71%	0.1	3.2326
10	1.83	27.44%	0.1	3.1820

Determination of emission reductions

$$ER_{y,i,j} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,i,j} \times 0.95$$

Where

$$NCV_{wood\ fuel} = 0.0156 \text{ TJ/tonne}$$

$$f_{NRB,y} = 0.95$$

$$EF_{wf,CO_2} + EF_{wf,non\ CO_2} = 112 + 26.23 = 138.23 \text{ tCO}_2/\text{TJ}$$

Example of calculation:

If $y=2$,

$$ER_{y,i,j} = 3.6012 \times 0.0156 \times 0.88 \times 138.23 \times 9000 \times 0.95$$

$$= 58,428 \text{ tCO}_2$$

Year	$B_{y,savings,i,j}$	$NCV_{wood\ fuel}$	$f_{NRB,y}$	$EF_{wf,CO_2} + EF_{wf,non\ CO_2}$	$N_{y,i,j}$	$ER_{y,i,j}$
1	3.6560	0.0156	0.88	138.23	10000	65,908
2	3.6012	0.0156	0.88	138.23	9000	58,428
3	3.5470	0.0156	0.88	138.23	8000	51,154
4	3.4932	0.0156	0.88	138.23	7000	44,082
5	3.4400	0.0156	0.88	138.23	6000	37,209
6	3.3874	0.0156	0.88	138.23	5000	30,533
7	3.3353	0.0156	0.88	138.23	4000	24,051
8	3.2837	0.0156	0.88	138.23	3000	17,759
9	3.2326	0.0156	0.88	138.23	2000	11,655
10	3.1820	0.0156	0.88	138.23	1000	5,736
					Total	346,515
					Annual Average	34,651

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	65,908	0	0	65,908
Year 2	58,428	0	0	58,428

Year 3	51,154	0	0	51,154
Year 4	44,082	0	0	44,082
Year 5	37,209	0	0	37,209
Year 6	30,533	0	0	30,533
Year 7	24,051	0	0	24,051
Year 8	17,759	0	0	17,759
Year 9	11,655	0	0	11,655
Year 10	5,736	0	0	5,736
Total	346,515	0	0	346,515

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$f_{NRB,y}$
Data unit	Fraction
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	Use a default value of 0.3 as per Tool 30 - Calculation of the fraction of non-renewable biomass. Or Calculate f_{NRB} by determining the
Value applied:	share of renewable and non-renewable woody biomass in the total quantity of woody biomass consumption for the country/region
Justification of choice of data or description of measurement methods and procedures applied	0.88 (calculated as per Meth tool)
Purpose of Data	This parameter shall be determined ex-ante. Default value as per Methodological tool : Calculation of the fraction of non-renewable biomass. As per of methodological tool, value is calculated as per following Equation (1),

	$fNRBy = NRB/(NRB+DRB)$
Comments	Calculation of baseline emission State of Forest report (Forest Survey of India Ministry of Environment, Forest & Climate Change, Gol, 2019)

Data / Parameter	$NCV_{wood\ fuel}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted or reduced
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 1 Introduction
Value applied:	0.0156
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	$EF_{wf,CO2}$
Data unit	tCO ₂ /TJ
Description	CO ₂ emission factor for the use of wood fuel in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories; Volume 2 Energy, Chapter 2 Stationary Combustion
Value applied:	112

Justification of choice of data or description of measurement methods and procedures applied	IPCC default value
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	η_{old}
Data unit	Fraction
Description	Efficiency of baseline cookstove
Source of data	Methodological default value
Value applied	0.1
Justification of choice of data or description of measurement methods and procedures applied	A default value of 0.1 shall be used if baseline device is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney
Purpose of Data	Calculation of emission reductions
Comments	-

Data / Parameter	η_p
Data unit	Fraction
Description	Efficiency of project stove at the start of project activity.
Source of data	Manufacturer's specification
Value applied	0.3195
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined ex-ante
Purpose of Data	Calculation of $\eta_{new,y,i,j}$
Comments	-

Data / Parameter	$(DF_n)^{y-1}$
Data unit	Fraction
Description	Discount factor to account for efficiency loss of project cookstove per year of operation (fraction).
Source of data	As per methodology, default value of 0.99 efficiency loss per year
Value applied	0.99
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined ex-ante
Purpose of Data	Calculation of $\eta_{new,y,i,j}$
Comments	-

Data / Parameter	Life Span
Data unit	Number of years
Description	The operating lifetime of the project device. The life span should be reported if the methodology equation 5 is adopted to determine the project stove efficiency
Source of data	Manufacturer's specification
Value applied	10
Justification of choice of data or description of measurement methods and procedures applied	This parameter shall be determined ex-ante
Purpose of data	Calculation of emission reductions
Comments	-

5.2 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$
Data unit	Number
Description	Number of project devices of type i and batch j operating during year y
Source of data	Monitoring
Description of measurement methods and procedures to be applied	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision according to the latest version of Standard for sampling and surveys for CDM project activities and programme of activities.
Frequency of monitoring/recording	At least once every two years
Value applied	For ex-ante emission reduction calculation, it is assumed that the project will distribute up to 10,000 ICS.
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	Proportion of operational stoves obtained from the survey is multiplied by the total commissioned stoves to arrive at this value
Comments	-

Data / Parameter	$\eta_{new,y,i,j}$
Data unit	Fraction
Description	Efficiency of the improved cookstove type i and batch j determined through water boiling test (WBT) during year y
Source of data	Calculation

Description of measurement methods and procedures to be applied	To adopt Option V given in the methodology: “Efficiency of the improved cookstoves to be estimated using equation 5 above where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored”																						
Frequency of monitoring/recording	Annually																						
Value applied	For ex-ante calculation, the value below is applied. <table border="1"> <thead> <tr> <th>Year (y)</th><th>$\eta_{new,y,i,j}$</th></tr> </thead> <tbody> <tr><td>1</td><td>30.03%</td></tr> <tr><td>2</td><td>29.73%</td></tr> <tr><td>3</td><td>29.44%</td></tr> <tr><td>4</td><td>29.14%</td></tr> <tr><td>5</td><td>28.85%</td></tr> <tr><td>6</td><td>28.56%</td></tr> <tr><td>7</td><td>28.28%</td></tr> <tr><td>8</td><td>27.99%</td></tr> <tr><td>9</td><td>27.71%</td></tr> <tr><td>10</td><td>27.44%</td></tr> </tbody> </table>	Year (y)	$\eta_{new,y,i,j}$	1	30.03%	2	29.73%	3	29.44%	4	29.14%	5	28.85%	6	28.56%	7	28.28%	8	27.99%	9	27.71%	10	27.44%
Year (y)	$\eta_{new,y,i,j}$																						
1	30.03%																						
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4	29.14%																						
5	28.85%																						
6	28.56%																						
7	28.28%																						
8	27.99%																						
9	27.71%																						
10	27.44%																						
Monitoring equipment	-																						
QA/QC procedures to be applied	-																						
Purpose of data	Calculation of emission reductions																						
Calculation method	Calculation to be performed using equation below: $\eta_{new,y,i,j} = \eta_p \times (DF_n)^{y-1} \times 0.94$																						
Comments	-																						
Data / Parameter	$B_{y=1,new,i,j,survey}$																						

Data unit	Tonnes
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type i and batch j should be in line with the latest version of Standard for sampling and surveys for CDM project activities and programme of activities or guidelines provided in methodology Section 8.4 option (b). Determined in the first year of the introduction of the devices (e.g. during the first year of the crediting period, $y=1$) through measurement campaigns at representative households and/or sample survey. Sample surveys to estimate this parameter, that are solely based on questionnaires or interviews (i.e. that do not implement measurement campaigns) may only be used if the following conditions are satisfied. (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households; (ii) If multiple devices are used in the project, it is possible from the results of the survey questions to clearly differentiate the quantity of firewood being used by each device. In other words, if more than one device, or another device that consumes firewood, are in use in project households, then the sample survey needs to distinguish the quantity of firewood used by the project device and the other devices that use firewood.
Frequency of monitoring/recording	Determined in the first year of project implementation
Value applied	For ex-ante calculation, the value is assumed as 5 kg/device/day or equal to 1.83 tonnes/device/year.
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	-
Comments	-

Data / Parameter	Life Span
Data unit	Number of years
Description	The operating lifetime of the project device. The life span should be reported if the methodology equation 5 is adopted to determine the project stove efficiency
Source of data	Manufacturer's specification
Description of measurement methods and procedures to be applied	--
Frequency of monitoring/recording	Once at the time of project stove installation
Value applied	10
Monitoring equipment	-
QA/QC procedures to be applied	-
Purpose of data	Calculation of emission reductions
Calculation method	-
Comments	-

5.3 Monitoring Plan

Measurement/monitoring of few parameters based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision according to the latest version of Standard for sampling and surveys for CDM project activities and programme of activities. Alternately, simplified approach proposed in option (b) under Section 8.4 of methodology may be used for determining the minimum sample size in which case compliance with 90/10 confidence precision is not obligatory.

100 Sample size is selected being target population is above 1000 as per below requirement of methodology-

Alternatively, the project participant may follow the simple random sampling approach and the minimum sample size should be determined as per the following guidelines:

- Project target population < 300: Minimum sample size 30
- Project target population 300 – 1000: Minimum sample size 10% of group size
- Project target population > 1000: Minimum sample size 100

Monitored Parameters

The project involves Introduction of improved cook stove as energy efficiency measures:

No.	Monitoring Parameters	Sampling parameters	Parameter type	Monitoring frequency
1	$N_{y,i,j}$ Number of project devices of type i and batch j operating during year y	Proportion of ICS still in operation	Proportion	Biennially (once in two year)
2	$B_{y=1,new,i,j,survey}$ Quantity of woody biomass used by project devices in tonnes per device of type i . and batch j	Daily consumption of woody biomass per ICS	Mean value	Determined in the first year of project implementation

Target Population

The target population will be the complete set of appliances (ICS) deployed under the project.

Sampling Method

The project involves distribution of ICS throughout the project area thereby replacing traditional cooking devices. The population is heterogeneous in nature i.e. common technology with similar operating characteristics but dispersed i.e. distribution of ICS is spread across different states/province of the country. The population consists of sub- populations which are homogeneous called as Strata. The characteristics of population (for example quantity of biomass consumed) are more similar within the stratum (ICS of same type, vintage and

zone in which they are operating) than across the strata. Therefore, Stratified Sampling technique will be used to conduct sampling survey among ICS batches.

The populations of each batch will be combined together, the sample size is determined, and a single survey will be undertaken to collect data. To ensure the survey result is representative of the entire population, the dissimilarity (such as ICS type, vintage and zone in which they are operating) within the included project activity instance will be taken into account in the sample size calculation. The ICS of same type, vintage and zone in which they are operating will be grouped in the same strata. Samples will be drawn by using the random number generator.

To determine the parameters, sampling will involve the following approaches (outcome in brackets):

$N_{y,,}$ Visual inspection of the premises to see if ICS is operational and in use. Interview with end user if required to verify that ICS is still in use (Yes/No)

$B_{y=1,new,i,j,survey}$ Interview with end user and estimate the daily consumption of woody biomass of ICS (Daily consumption of woody biomass)

Sample Size:

This simplified approach may also be used for determining minimum sample size for parameters listed under Sections 9.1 and 9.2 of the methodology in which case it is not requisite for the sample size to meet confidence/precision requirements.

The project proponent may choose to use the same sample to monitor more than one parameter. According to the Standard for sampling and surveys for VCS 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. For instance, the project proponent may sample separately **$N_{y,,j}$** and **$B_{y=1,new,i,j,survey}$** –or a combination of two parameters in the same sample. Sampling more than one parameter within the same sample (household) helps reduce travel needs for monitoring and the associated costs. At the same time this approach ensures the random selection of samples for every parameter.

Oversampling is strongly encouraged, not only to compensate for any attrition, outliers or non-response associated with the sample, but also to prevent a situation at the analysis stage where the required reliability is not achieved and additional sampling efforts would be required. The sample size shown above will be adjusted upwards to account for non-responses, Project proponent shall determine the appropriate non-responses rate based on previous experience.

Sampling Frame

Separate samples shall be taken for each project activity instance. The sampling frames shall be defined as per below. In overall, a batch of ICS will have same group of end users which is household users, thus it is expected that the geographical locations do not have influence on the parameter of interest. Therefore, all monitoring parameters can be assumed to be highly homogeneous for each ICS model regardless of how the end user group and distribution/installation location is defined.

Data to be collected:

Field Measurement:

The table below summarizes field measurement data requirements:

Parameter	Timing (indicative)	Frequency as required by methodology	Methods to be applied	Comments on seasonal fluctuation
$N_{y,i,j}$	Monitoring will likely occur every 12 to 24 months	Biennially	Visits to the premises, visual inspection and interview with ICS end-user.	Not due to any seasonal fluctuation.
$B_{y=1,new,i,j,survey}$	Monitoring will likely occur within the first year after installation	First year of installation	Visits to the premises, visual inspection and interview with ICS end-user.	Not due to any seasonal fluctuation.

soft copies of the surveys will be kept and the database will have back up. Original stove purchase contracts, information collected from the registration or other means of acceptance by the users will be stored in the project office. A back-up of the project database will also be stored on an electric medium. All data monitored and required for verification and issuance will be kept for two

years after the end of the crediting period or the last issuance of credits for the project activity, whichever is later.

(i) Quality Assurance/Quality Control

The project proponent will apply measures to ensure the required confidence/precision for each sampled parameter is met, allowing for non-response and the possible removal of outliers from the sample, as part of a Quality Control/Quality Assurance system. The choice of measure applied to each parameter will depend on the cost of each data collection approach and logistics required. The project proponent will determine the most effective measure for each parameter from the following list:

- Oversampling: Randomly draw a sample more than the calculated number (say 20%) and collect data from each
- Buffer Group: Randomly draw additional samples (say 20%) and collect data from only for minimum numbers of ICS as per sample size calculation. If this would not result in the required sample size data would be collected from the additional ICS that were selected in the sample.
- If precision required is not achieved by reliability check, use the lower bound or upper bound of estimates of the parameter.

The sampling plan has the following procedures in place to ensure good quality data. The project proponent will ensure that field personnel have reviewed, understand and have agreed to follow the monitoring plan procedures, including provisions for maximizing response rates, documenting out-of-population cases, refusals and other sources of non-response. A quality control and assurance strategy will be documented. Quality control and assurance strategies include addressing non-sampling errors, such as non-response or bias from interviewer. The project proponent or a competent third party designated by the project proponent with the proper skills will train the monitoring personnel on how to properly survey households to prevent bias from interviewer. In the case a household refuses to participate, another household will be chosen at random. To reduce interviewer bias, good questionnaire design and well-tested questionnaires will be used.

Roles and responsibilities of different participators are proposed to be as follows:

Entity/Person	Roles & Responsibilities
---------------	--------------------------

Greneity Infocom Service Pvt Ltd	✓ VCS documentation development ✓ Communicate with VERRA for all VCS related matters ✓ Communicate with DOEs for validation & verification ✓ Identify local partners for local representation and support ✓ Identity suitable ICS manufacturers ✓ Design the distribution plan for on ground implementation of ICS ✓ Design the monitoring system(including data collection in an electronic database) ✓ Training and development of local resources (as may be required) ✓ Regular Monitoring and quality assurance of data ✓ Monitor & Supervise on-ground distribution, etc. ✓ Annual Review meeting with Local Teams and other associated entity in order to ensure continuous improvements of the project activity
Distributor / Operational Team (Local Representative)	✓ To support & assist Greneity Infocom Service Pvt Ltd in achieving the stated goal of the project activity ✓ Assist and facilitate Greneity Infocom Service Pvt Ltd in baseline data collection, efficiency testing, data of biomass consumption for new ICS through sampling survey etc. ✓ To be the local representative and communicate, act and engage in implementation activities of project activity ✓ To identify and deploy suitable local team and resources for ICS distribution, data collection, regular spot-check at households etc. ✓ Assist and facilitate Greneity Infocom Service Pvt Ltd during training of the Operational Team and capacity building across the end users. ✓ To bridge any gap in between end users of ICS and Greneity Infocom Service Pvt Ltd in order to ensure smooth operation of the program to achieve overall objective of the project activity ICS Distributor(s) – who will be responsible for deploying the ICS at household and register the end user in the digital tool. They will also be responsible for giving demonstration of ICS use, discussing with the end users on its benefits and educate them on continued use of ICS and discontinuation of the use of conventional/traditional open firing practice. They will also conduct periodic check at households to gather feedback, address any technical concerns, collect necessary data and transmit the information.
ICS Manufacturer or Supplier	✓ To design and develop ICS as per required standard ✓ To provide technical parameters and manufacturer's efficiency etc. at the time of supply ✓ To educate and train Greneity Infocom Service Pvt Ltd team on the installation (delivery), uses, handling etc. of the ICS at households.

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	$N_{y,i,j}$
------------------	-------------

Data unit	Number
Description	Number of project devices of type I and batch j operating during year y
Value applied:	For project activity, 10,000 ICS to be distributed initially. The ICS operational status based on survey results will be considered for second year of operation.
Comments	Proportion of operational stoves obtained from the survey is multiplied by the total commissioned stoves to arrive at this value. The survey will be conducted at least once every two years basis after implementation of project activity instance.

Data / Parameter	$B_{y=1,new,i,j,survey}$
Data unit	Tonnes
Description	Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j, determined in the first year of the implementation of the project through a sample survey
Value applied:	Based on survey result, the value will be calculated. For estimation of ER, 5 kg/device/day or equal to 1.83 tonnes/device/year is considered.
Comments	The survey is conducted in Determined in the first year of project implementation.

6.2 Baseline Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 4.4.

6.3 Project Emissions

The methodology does not account for baseline emissions separately, but instead quantifies net emission reductions achieved by the project. Please refer to Section 4.4

6.4 Leakage

Leakage shall be considered as default 0.95 in accordance with methodology

6.5 Net GHG Emission Reductions and Removals

The below calculations are represented for project activity instance 1 - The improved cookstove is introduced as energy efficiency measure in the project, therefore equations 1 and 2 of the methodology will be applied to calculate the net GHG emission reductions

$$ER_y = \sum_i \sum_j ER_{y,i,j}$$

Where:

- i = Indices for the situation where more than one type/model of improved cookstove is introduced to replace three-stone fire
- J = Indices for the situation where there is more than one batch of improved cookstove of type i
- ER_y = Emission reductions during year y in t CO₂e
- $ER_{y,i,j}$ = Emission reductions by improved cookstove of type i and batch j during year y in t CO₂e

$$ER_{y,,} = B_{y,savings,i,j} \times NCV_{wood\ fuel} \times f_{NRB,y} \times (EF_{wf,CO2} + EF_{wf,non\ CO2}) \times N_{y,,} \times 0.95$$

Where:

- $B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per improved cookstove of type i and batch j during year y
- $f_{NRB,y}$ = Fraction of woody biomass that can be established as non-renewable biomass (fNRB)⁵
- $NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (IPCC default for wood fuel, 0.0156 TJ/tonne)⁶
- $EF_{wf,CO2}$ = CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 112 tCO₂/TJ)⁷
- $EF_{wf,non\ CO2}$ = Non-CO₂ emission factor for the use of wood fuel in baseline scenario (IPCC default for wood fuel, 26.23 tCO₂/TJ)⁸
- $N_{y,i,j}$ = Number of improved cookstoves of type i and batch j operating during year y

0.95 = Discount factor to account for leakage

The quantify of woody biomass saved due to implementation of improved cookstoves to be estimated using equation below (Equation 4 of methodology)

$$B_{y,savings,i,j} = B_{y=1,new,i,survey} \times \left(\frac{\eta_{new,i,j}}{\eta_{old}} - 1 \right)$$

where

η_{old} = Efficiency of baseline cookstove

$\eta_{new,y,i,j}$ = Efficiency of the improved cookstove type i and batch j determined through water boiling test (WBT) during year y
Alternatively, efficiency may be determined using below Equation

$B_{y=1,new,i,j,survey}$ = Annual quantity of woody biomass used by improved cookstoves in tonnes per device of type i and batch j , determined in the first year of the implementation of the project through a sample survey.

$$\eta_{new,i,y} = \eta_p \times (DF_n)^{y-1} \times 0.94$$

where

η_p = Efficiency of project stove (fraction) at the start of project activity.
Discount factor to account for efficiency loss of project cookstove per year of operation (fraction). This value may be based on actual monitoring or based on manufacturer's declaration on expected loss in efficiency or through publicly available literature on relevant industry standards. Alternatively default value of 0.99 efficiency loss per year can be considered.

0.94 = Adjustment factor to account for uncertainty related to project cookstove efficiency test.

For emission reduction calculation purpose, the below data is applied for first project activityinstance.

- The project is planned to install 10,000 ICS initially in Uttar Pradesh
- Though ICS installation, end date of installation of project activity instance is considered asoperational date of that project activity instance.
- The life span of ICS is 10 years
- Each ICS is considered as project activity instance
- $B_{y=1, new,i, survey}$ is will be taken as per survey result .

The Actual ER calculations will be done during Verification stage.

The Vintage wise summary for project activity instance 1 will be calculated during verification stage, thus below table is kept blank.

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year A				
Year...				
Total				

There is no any separate calculations for baseline emissions, project emissions and leakageemissions, and methodology directly calculates emission reductions. Hence same emission reductions are based as baseline emissions in above table.

APPENDIX X: <TITLE OF APPENDIX>

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