



**Verified Carbon
Standard**

IMPROVED COKSTOVE PROGRAMME BY SDG13 IN INDIA

Document Prepared by - Jagurih Corporate Consultants Pvt. Ltd.

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The grouped project activity reduces greenhouse gases emissions by disseminating fuel- efficient cookstoves in India. It seeks to increase access of households and communities to improved cookstoves by disseminating high thermal efficiency and low greenhouse gas emitting cooking stoves known as Improved Cook Stoves (ICS) to the rural and semi-urban households of India. Their old low efficiency and high greenhouse gas emitting stoves are being replaced with improved cookstove. The implementation of the project activity has resulted in the reduction of firewood consumption & consequent emissions from combustion leading to climate change mitigation in a sustainable manner. Overall objectives are reduction of greenhouse gases, conservation of forests and woodlands as well as improved health conditions of ICS users due to improved indoor air quality along with drudgery reduction in everyday cooking.

The project activity has distributed single type/single pot Greenway Jumbo portable cookstoves. During current monitoring period total 29,860 ICS were distributed to individual households in various districts of Madhya Pradesh state of India. The ICS deployed under project activity are manufactured and supplied by Greenway Grameen Infra Pvt Ltd is also a local partner to supply and engage local NGOs/staffs for assembly of ICS, awareness programme, identification of end users, distribution of cookstove and data collection.

The distribution of ICS started from 9th October 2021 and first batch of commissioning is considered as 01 January 2022, which is also start date of crediting period for the project activity. Onwards daily basis number of ICS distributed are considered as a batch for calculation of emission reduction. All the data recorded during stove registration was captured through app and hard copy, the collected information is then transferred to project database.

The survey to collect information on number of project ICS operational, any additional cookstove or baseline cookstove usage along with project ICS was planned in June 2022 and actual survey conducted from July 2022 to August 2022. During survey all the project ICS found to be operational and no second stoves or baseline stove usage observed.

During current monitoring period i.e. from 01 January 2022 to 30 April 2022 total **29,860 ICS** were operational and resulted **29,603 tCO₂e** emission reduction.

Audit History:

Audit Type	Period	Program	VVB Name	Number of years
Validation	NA	<u>VCS</u>	<u>KBS Certification Services</u>	NA

Verification	01-January-2022 to 30-April-2022	<u>VCS</u>	<u>Applus+ Certification</u>	4 months
Total	01-January-2022 to 30-April-2022			4 months

1.2 Sectoral Scope and Project Type

Sectoral Scope: 03

Project Type: Type II – Energy Efficiency Improvement Project

Grouped Project: Yes

1.3 Project Proponent

Organization name	SDG13 Ventures Pte Ltd
Contact person	Ms Neha Juneja
Title	Director
Address	100 Peck Seah Street #10-18 PS100 Singapore 079333
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1.4 Other Entities Involved in the Project

Organization name	Jagurih Corporate Consultants Pvt. Ltd.
Role in the Project	Consultant
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Title	Consultant
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1.5 Project Start Date

01-January-2022, the date of commissioning of first batch of ICS.

1.6 Project Crediting Period

The project proponent has chosen fixed crediting period of 10 years, the start date of crediting period is 01-January-2022 and crediting period is from 01-January-2022 to 31-December-2031 (both days inclusive).

1.7 Project Location

The grouped project geographical boundary is host country Republic of India. The project boundary is defined by the following GPS coordinates:

North-34°27'56"N, 75°43'54"E.

South-08°6'21"N, 77°32'30"E

West-22°15'58"N, 69°02'05"E

East-26°16'20"N, 94°58'04"E



The current monitoring ICS distributed in 46 different districts of Madhya Pradesh State of India. The details of the same can be checked from 'distribution records'. The distribution of ICS occurred in the following districts of Madhya Pradesh, India.

S. No.	District	S. No.	District
1	Alirajpur	24	Khandwa

2	Ashok Nagar	25	Kirnapur
3	Bahir	26	Mandla
4	Balaghat	27	Morena
5	Barwani	28	Narshinghpur
6	Betul	29	Panna
7	Bhind	30	Raisen
8	Bhopal	31	Rajgarh
9	Bodla	32	Ratlam
10	Burhanpur	33	Rewa
11	Chhatarpur	34	Sagar
12	Chhindwara	35	Satna
13	Damoh	36	Sehore
14	Dewas	37	Seoni
15	Dhar	38	Shahdol
16	Dindori	39	Shajapur
17	East Nimar	40	Shivpuri
18	Garhakota	41	Sidhi
19	Gwalior	42	Sinrauli
20	Hoshangabad	43	Tikamgarh
21	Indore	44	Ujjain
22	Jabalpur	45	Umaria
23	Katni	46	Vidisha

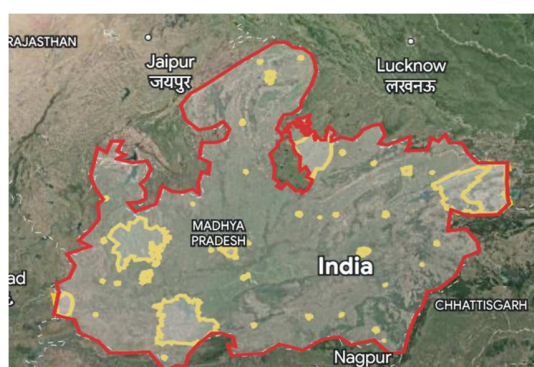


Fig: Project location

1.8 Title and Reference of Methodology

Following approved baseline & monitoring methodology is applied;

Methodology: VMR0006- Methodology for Installation of High Efficiency Firewood Cookstoves

Version: 1.1

Sectoral Scope: 03

Tools:

“TOOL30: Calculation of the fraction of non-renewable biomass”; Version-03, EB 108, Annex 11

1.9 Participation under other GHG Programs

The project activity has not been registered or currently seeking registration under any other GHG programs. The project has not participated under any other GHG program other than SD Vista.

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

- This project activity is voluntary initiative and it is not to meet any local laws or regulatory compliances. An undertaking has been submitted that PP shall not claim for GHG emission reduction credits for the current monitoring period under any other emission-trading program or GHG binding limits, however is under additional certification under SD VISTa.
- The Project Proponent declares that emission reductions generated from the project activity will not be double-counted (i.e. issuance of other form of environmental credit like under CDM) for the current monitoring period, which is being claimed under VCS mechanism. PP has submitted an undertaking to the VVB that they shall not claim for GHG emission reduction credits for the for the current monitoring period under any other emission-trading program.

1.11 Sustainable Development Contributions

The project activity involves distribution of improved cookstoves to displace traditional inefficient stoves used for cooking in individual households. The project generates unique benefits in terms of the planet, the local population and their prosperity. The project is located in Madhya Pradesh state of India, where approximately 2 million people continue to use traditional mud stoves for cooking.

Distribution of improved cookstoves especially helps in mitigating global the effects of climate change and targets many intertwined aspects of rural life that remain unnoticed in the larger discourse of nationwide progress, and scientific advancement.

The table below discusses the specific outcomes and impacts of this project.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
Sequential row number	SDG Target number	Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator	Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)	Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.	Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.
1)	7.1	7.1.2: Proportion of population with primary reliance on clean fuels and technology	implemented activities to increase	Distribute 29,860 high-efficiency, clean burning Greenway Jumbo Cookstoves to benefit over 120,000 individuals.	Distribute 29,860 high-efficiency, clean burning Greenway Jumbo Cookstoves to benefit over 120K individuals.
2)	13.2	Tonnes of greenhouse gas emissions avoided or removed	implemented activities to increase	Reduce the total fuelwood usage in the project resulting 29,603 tCO ₂ e of emission reductions for first 4 months.	Reduces the total fuelwood usage in the project area resulting 29,603 tCO ₂ e of emission reductions for first 4 months.
3)	3.9	3.9.1: Mortality rate attributed to household and ambient air pollution	implemented activities to decrease	The project has lead to reduction in 70% smoke resulting reduction in Household Air Pollution (HAP) thereby resulting in improved health conditions of women and children.	The project has lead to reduction in 70% smoke resulting reduction in Household Air Pollution (HAP) thereby resulting in improved health conditions of women and children.

4)	5.4	5.4.1: Proportion of time spent on unpaid domestic and care work, by sex, age and location	<i>implemented activities to decrease</i>	Under the project scenario, women have seen a massive reduction in both the amount of fuelwood required for cooking, and the amount of time taken to cook. They were able to save 2.5 hours daily. They also have time to engage in other employment opportunities.	Under the project scenario, women have seen a massive reduction in both the amount of fuelwood required for cooking, and the amount of time taken to cook. They were able to save 2.5 hours daily. They also have time to engage in other employment opportunities.
5)	8.3	8.3.1: Proportion of informal employment in total employment, by sector and sex	<i>implemented activities to increase</i>	The project generated around 30 employment opportunities for assembling of ICS, distribution of ICS and post-sale operation & Maintenance of ICS	The project generated around 30 employment opportunities for assembling of ICS, distribution of ICS and post-sale operation & Maintenance of ICS
6)	3.2	SDG 3.2.1 Under-five mortality rate SDG 3.2.2 Neonatal mortality rate	<i>implemented activities to decrease</i>	Reduced the risk of mortality among infants and children under five years of age due to (1) acute lower respiratory illnesses (ALRI), such as pneumonia and bronchitis, the cause of mortality in 12% of children under five, and (2) burns resulting from children falling into open cooking fires.	Reduced the risk of mortality among infants and children under five years of age due to (1) acute lower respiratory illnesses (ALRI), such as pneumonia and bronchitis, the cause of mortality in 12% of children under five, and (2) burns resulting from children falling into open cooking fires.

2 SAFEGUARDS

2.1 No Net Harm

No potential negative environmental or socio-economic impacts have been identified during current monitoring period due to usage of ICS, rather as per feedback during survey it has positive impacts.

2.2 Local Stakeholder Consultation

The local stakeholder consultation under the grouped project activity was conducted on 03/05/2021 at Mahua Vann Resort, village Kuppitola, district Seoni from 11 a.m. to 2 p.m. The stakeholder consultation was conducted at the group project activity level as the technology and its impact will be similar for all the project instances implemented in this group project activity. All interested stakeholders representing the following groups: traditional stove users, representatives from local self-help groups, field assistants working in the project, local leaders and NGO representatives attended the meeting.

The stakeholders present were informed about the objective of meeting and being requested to raise any concerns anytime (during and also after the meet) they may have regarding technology or programme. All the attendees were provided with the details of the project implementors if they wish to raise any concerns even after the local stakeholder meeting.

There were no negative comments raised by stakeholders in local stakeholder consultation meetings and due to the associated benefits stakeholders have appreciated the proposed project activity.

The representative of PP during survey has again taken feedback from the selected households under sample survey and also as contact details shared during local stakeholder consultation representative of PP can be reached by any stakeholder for complaints/feedback. As no issues raised during current monitoring period and till completion of survey, hence no action was needed by PP.

During current monitoring period the representative of PP i.e. Gramin Sahayak have periodically taken feedback from end users on and no negative feedback received. There were no concerns raised during current monitoring period, hence no re-consultation was required.

2.3 AFOLU-Specific Safeguards

Not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity is implemented and operated as per registered PD. The PP has distributed single pot/single model i.e. Greenway Jumbo Cookstove in various district of Madhya Pradesh State of India. These stoves are also portable, allowing households the flexibility of usage. From 09 October 2021 till 30 April 2022 total 29,860 Greenway Jumbo cookstoves distributed to individual households.

The distribution of ICS is performed by local agent of PP i.e. Greenway Gramin Infra Pvt. Ltd. The distribution team has used an app developed in-house to record user data, unique ID along with end user agreement, which can be accessed and verified as and when needed. The staff were trained well to execute the distribution plan including data collection, training to end users on proper usage of improved cookstove. The end users also provided with contact details of concern person to connect for any complaint and feedback. The survey was performed using an open-source software (KoBo Toolbox).

There were no incidents during current monitoring period which negatively impacts emission reduction calculation and all the ICS were operational. No break down of the project stove was observed. It was seen the there was a slight usage of baseline stove during current monitoring period observed, which was not significant.

3.2 Deviations

3.2.1 Methodology Deviations

- There is no methodology deviation taken during current monitoring period.

3.2.2 Project Description Deviations

There is no project description deviation taken during current monitoring period.

3.3 Grouped Projects

The current instance under verification is already covered during validation and registration of the project activity and meets all the eligibility requirements.

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	The geographical boundary of the project instances including any time- induced boundary consistent with the geographical boundary set in the Project Description	The project boundary corresponds to the boundaries of host country India. All distributed ICS in a project instance shall be located within geographical boundary of India.	The current instance ICS distributed in various districts of Madhya Pradesh State of India. The same can be checked distribution records and end user agreements. Hence eligibility criteria is met.
2	Conditions that avoid double counting of emission reductions like unique identification of product and end-user locations	A unique numbering system for ICS will be applied in each project stances, assigning a unique number to each ICS and allowing to clearly identify for each ICS to which project stance/cluster it belongs. Provisions will be made to collect geo-coordinates.	Each ICS distributed has unique identity and corresponding end user details (i.e. name, address etc.). Additionally, unique id shall be displayed on the stove itself. The unique numbering or identification regime can be verified. The distribution app captures the end-user location details, including geo-coordinates in the database. Hence, the eligibility criteria is met.
3	The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications	Project stances under this project will consist of the distribution of ICS with a thermal efficiency of at least 25% efficiency as per water boiling test or compliance with Tier II and above as per ISO to household users cooking with non- renewable biomass in the baseline scenario.	The project proponent has distributed single pot Green Jumbo cookstove having certified efficiency of 38%. Hence eligibility criteria is met.

		The project instances will involve replacement of conventional firewood cook-stoves for biomass fired ICS as defined in the VCS PD. Stove types replaced and implemented is defined in the VCS PD, and hence appliances involving the efficiency improvements in the thermal applications of non-renewable biomass as per VMR0006.	
4	The conditions that ensure that the project instances meet the requirements pertaining to the demonstration of additionality	Have characteristics with respect to additionality that are consistent with the initial instances for the specified project activity and geographic area.	The additionality is demonstrated using financial barrier option in line with applied approved methodology VMR0006 Step 1: The project implementation is not mandated by government policy or regulation in host country. Step 2: Not applicable Step 3: As the PP has sold ICS at more than 60% subsidy, hence the return from project is negative and sale of VCUs will help in funding gap. Hence project activity is additional. Hence eligibility criteria is met.
5	Where applicable, the conditions related to sampling requirements for the project in accordance with the “Standard for sampling and surveys for	Monitoring will adhere to all requirements related to sampling for a project instance in accordance with the sampling guidelines including all	Specification of the sampling methods applied and compliance with the sampling requirements are established at the Project Description.

	CDM project activities and programme of activities”	annexes and amendments till EB 86 Annex 04 and Sampling and surveys for CDM project activities and program of activities version 09.0	The Sampling has been undertaken as part of the Project Description Sampling Plan. Hence eligibility criteria is met.
6	VCUs ownership	End users receiving ICSs under the specific project instances contractually cede their rights to claim and own emission reductions under the VCS to the PP of the project.	A default distribution agreement for end users including the provision that emission reductions generated by the stove are owned by the PP is being signed by each individual end users, and same is submitted to VVB.
7	Where a capacity limit applies to a project activity included in the project, no Project instance shall exceed such limit. Further, no single cluster of project activity instances shall exceed the capacity limit, determined as follows: Each device that exceeds one percent of the capacity limit shall be identified. Such instances shall be divided into clusters, whereby each cluster is comprised of any system of instances such that each instance is within one kilometer of at least one other instance in the cluster. Instances that are not within one kilometer of	The grouped project does not have any specified capacity limits applicable, since there are no capacity limits defined within the applied methodology, VMR0006, ver. 1.1. Therefore, this eligibility criteria is not applicable.	Not applicable.

	any other instance shall not be assigned to clusters. 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		
8	Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance	The new project instance shall be required to provide an affirmation that funding from annex I parties, if any, does not result in a diversion of official development assistance	For this instance, no funding from Annex-1 parties is received and hence, no ODA declaration is required.
9	The Group project- specific requirements stipulated by the project proponent including any conditions related to undertaking local stakeholder consultations and environmental impact analysis	The local stakeholder consultation conducted at group PD level and validated during registration. Each new project instance/project will be implemented in similar social economic situations. The key stakeholders of the program both at group project activity and new project instance level are the same. No further actions needed at the new project instance level to satisfy the eligibility criteria.	The local stakeholder consultation done at grouped project level and no further action needed. The project instance under current periodic verification is validated as first actual instance.

10	Have a start date that is the same as or later than the grouped project start date	All future instances shall have the start date after the date of first instance.	The project instance under verification is first instance and start date of this project instance is same as start date of grouped project.
11	Applicability of VCS methodology	All future instances shall fulfil all-applicability criteria of VCS methodology VMR0006, v1.1.	The project instance under verification is first instance and meets all the applicability condition of VMR0006 V1.1, the same is being validated during registration of grouped project activity.
12	Are subject to the baseline scenario determined in the project description for the specified project activity and geographic area	The new instance shall adhere the baseline requirements of the VMR0006, v1.1.	The project instance under verification is first instance and baseline is already established in line with VMR0006 V1.1 as use of wood based traditional stoves, the same is being validated during registration of grouped project activity.
13	Be eligible for crediting from the start date of the project activity instance through to the end of the project crediting period (only).	The project instance will be only eligible for the crediting from its start date through to the end of the project crediting period (only).	The crediting period of project instance under verification is start date of project instance.
14	Not be or have been enrolled in another VCS project	No project instance to be included which is part of other grouped or standalone VCS project	The project instance under verification is first instance included under grouped project and is not registered under any other grouped or standalone VCS project. A declaration regarding same is being provided to VVB.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$NCV_{woodfuel}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted or reduced
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	0.0156
Justification of choice of data or description of measurement methods and procedures applied	Default value as per applied approved methodology
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	EF_{wf,CO_2}
Data unit	tCO ₂ /TJ
Description	CO ₂ emission factor for the use of wood fuel in baseline scenario
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	112
Justification of choice of data or description of measurement methods and procedures applied	Default as per applied approved methodology VMR0006, v1.1
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	$EF_{wf,non\ CO_2}$
Data unit	tCO ₂ /TJ
Description	The non-CO ₂ emission factor for the use of wood fuel in baseline scenario
Source of data	Default as per applied approved methodology VMR0006, v1.1
Value applied	26.23
Justification of choice of data or description of measurement methods and procedures applied	Default as per applied approved methodology VMR0006, v1.1

Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

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 baseline emissions
Comments	The value is fixed ex-ante

Data / Parameter	η_P
Data unit	Fraction
Description	Efficiency of project stove at the start of project activity
Source of data	Manufacturer specification
Value applied	0.38
Justification of choice of data or description of measurement methods and procedures applied	The parameter shall be determined ex-ante
Purpose of Data	Calculation of $\eta_{y,i,j}$
Comments	The value is fixed ex-ante

Data / Parameter	f_{NRB}
Data unit	Fraction
Description	Fraction of woody biomass saved by the project activity in a year y that can be established as non-renewable biomass
Source of data	Calculated as per Tool 30 (version-03.0), calculation of the fraction of non-renewable biomass
Value applied	0.901

Justification of choice of data or description of measurement methods and procedures applied	The value established using latest information available on public domain PROJECT is implemented and will be fixed ex-ante. The fNRB value is established using as per the methodological tool 30 “calculation of fraction of non- renewable biomass” V03.0.
Purpose of Data	Calculation of baseline emissions
Comments	The value is fixed ex-ante

4.2 Data and Parameters Monitored

Data / Parameter	$N_{y,l,j}$
Data unit	Number
Description	Number of project devices of type l and batch j operating during year y
Source of data	Monitoring
Description of measurement methods and procedures to be applied	Monitored based on a representative sample through a survey. Sampling standard is being used for determining the sample size to achieve 95/10 confidence precision according to the latest version of Standard for sampling and surveys for CDM project activities and programme of activities. The sample size calculated as per required confidence and precision level is 20, however PP has considered 180 samples, which is conservative. The project achieves 3.19% precision level.
Frequency of monitoring/recording	At least once every two years
Value monitored	29,860
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	The project implementor maintains a distribution record to calculate this parameter. The survey conducted during current monitoring period reveals 100% ICS were operational.
Purpose of the data	Calculation of baseline emissions
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	$\eta_{new,l,j}$
Data unit	Fraction

Description	Efficiency of the device of each type i and batch j implemented as part of the project activity
Source of data	Manufacturer specification or <i>Certification by a national standards body or an appropriate certifying agent recognized by that body</i>
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 of applied approved methodology where loss in efficiency per year is calculated, and therefore this parameter does not need to be monitored"
Frequency of monitoring/recording	Annual
Value monitored	0.38 at start of operation Year 1= 0.357 Year 2=0.354 Year 3=0.350 Year 4=0.347 Year 5=0.343 Year 6= 0.340 Year 7= 0.336
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	Calculation of baseline emissions
Calculation method	As per equation 5 of VMR0006, version 1.1 i.e. $\eta_{new,i,j} = \eta_P \times (DF_n)^{y-1} \times 0.94$
Comments	For current monitoring period efficiency used as 38% as these covers first 3 months of operation of ICS after commissioning is appropriate
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). The PP has conducted survey based on random sample and confirms that (i) Baseline cookstoves have been completely decommissioned and only improved cookstoves are exclusively used in the project households; Based on initial pilot survey the sample size calculated as per required confidence and precision level is 19, however PP has considered 180 samples, which is conservative. The project achieves 3.19% precision level.
Frequency of monitoring/recording	Determined in the first year of project implementation
Value monitored	1.245 tonne/device/year
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	The project activity meets the precision level at required confidence level
Purpose of the data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	–

Data / Parameter	Life span
Data unit	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 specification
Description of measurement methods	The data source as per manufacturer specification

and procedures to be applied	
Frequency of monitoring/recording	Once at the time of installation of batch of type of stove
Value monitored	7
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	Calculation of baseline emission
Calculation method	Not applicable
Comments	--

Data / Parameter	Date of commissioning of batch j
Data unit	Date
Description	To establish the date of commissioning, the Project Participant may opt to group the devices in "batches" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.
Source of data	Project database
Description of measurement methods and procedures to be applied	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Frequency of monitoring/recording	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Value monitored	01-January-2022
Monitoring equipment	Not applicable
QA/QC procedures to be applied	Not applicable
Purpose of the data	Calculation of emission reduction
Calculation method	Not applicable
Comments	--

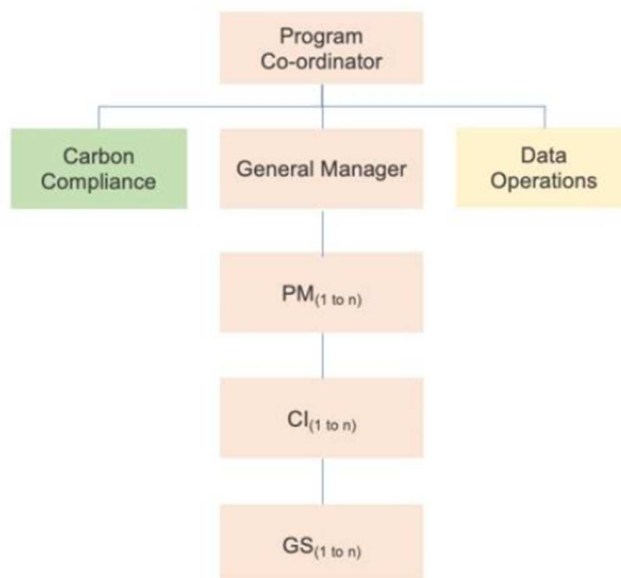
Data / Parameter	μ_y
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Data unit	Fraction
Description	Adjustment to account for any continued use of pre-project devices during the year y
Source of data	Monitoring survey
Description of measurement methods and procedures to be applied	As the survey results reveals that the baseline cookstoves were decommissioned and no longer used, hence value 0 is considered and Bold, adjusted is equal to Bold.
Frequency of monitoring/recording	At least once in 2 years
Value monitored	0.895
Monitoring equipment	Monitoring survey
QA/QC procedures to be applied	A 95 /10 confidence / margin of error shall be achieved for the sampling parameter irrespective of annual / biennial monitoring frequency as per para 22 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version 09.0. Based on initial pilot survey the sample size calculated as per required confidence and precision level is 20, however PP has considered 180 samples, which is conservative. The project achieves 3.19% precision level.
Purpose of the data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	—

4.3 Monitoring Plan

Project Team Structure

The following is the project team structure. The team includes 4 broad functions, viz. Project management, Ground operations, Data management and Carbon compliance. The team members part of these functions and their roles are delineated in the following paragraphs.



Project Management

- A. The Program Coordinator supervises all the other functions in the projects and ensures that the necessary compliances are met. The coordinator is also working with internal as well as external stakeholders.
- B. The General Manager oversees the distribution plans of the PMs in the entire project boundary. The GM ensures efficient training is being provided to the GS and the CIs to ensure strict adherence to project requirements. He is in charge of supervising all the operational and carbon compliance activities pertaining to the project.

Ground Operations

- A. The Project Manager (PM) supervises project implementation (distribution and monitoring) across a region (consisting of multiple districts). PM makes sure the distribution is as per the project requirements. prepares a distribution plan with the CIs and demarcates the area of distribution for each GS.
- B. The Cluster In-charge (CI) is responsible for managing the GSs to ensure the supervised execution of the entire process. CI is the bridge of communication and coordination between the Project Managers and GSs. CI is also involved in awareness generation and monitoring activities along with the GS. The end-user information, carbon-waiver agreements and other documents are collected by the GS and sent to CI for verification. This information is then passed on to the Data team, which separately verifies this information, thus ensuring a two-step verification process.

- C. The Grameen Sahayak (GS) is the primary link to the customers. GS is responsible for distributing the stoves, collecting the user-information, monitoring them and training the users on how to use the stoves efficiently. They also address the customer- grievances and are the first line of contact with the households.

During the monitoring exercise- The survey team comprises Grameen Sahayaks (GS), Cluster Incharges (CI) and Project Managers (PM). Training on sampling and survey by PA Research & consultants Pvt Ltd. was provided to the team before commencing the survey exercise. This training ensures that the team understands the objective of the survey exercise, delivery of the survey, the cultural sensitivities of the local area, and the tools used to conduct the survey. The details of the sampling team is as below:

Name	Educational Qualification
Ms. Aditi Singh	Bachelor of Engineering
Ms. Silkee Nawani	Bachelor of Engineering Post Graduate Diploma in Management in Rural Management
Mr. Shaikh Asif	Bachelor of Computer Application Master of Science in Computer Science
Ms. Kavita Vishwakarma	Bachelor of Commerce
Mr. Sapan Deep	Bachelor of Engineering

Data Management

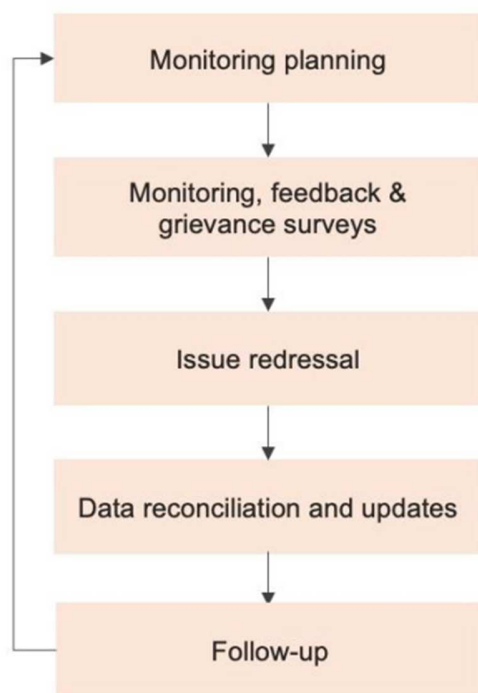
The data team constitutes of a Data Manager and a team of data-verifiers.

- A. The Data manager makes sure the data collection, storage, reporting and management process is streamlined and efficient. The data manager also ensures that the system to collect data is working as per the needs of the project and glitches are addressed.
- B. The data-verifiers make sure that the user information uploaded in the project records is correct. They do so by calling the beneficiaries for reconciliation purposes.

Data Management and Reconciliation

Monitoring

Surveys are conducted on KoBo Collect App by the survey team. The results are continuously monitored and validated by a Data Management team as well as the General Manager. They ensure that all the data is properly collected and any anomaly is addressed. To ensure data authenticity and integrity, the login details of KoBo toolbox are only with the General Manager.



About KoBo Toolbox

KoboToolbox is an open source platform for the collection, management, and visualization of data. As the most widely used primary data collection tool in the non-profit sector, it is the tool of choice for over 14,000 social impact organizations worldwide. The VCS 2533 survey form was created on KoBo toolbox. This form has two components- a web console and KoBo collect app. The app only allows for viewing and filling the form. All the results and filled details can only be viewed on the web console. The field team only had access to the mobile application. The access to web console was restricted to the general manager. The general manager used the web console to monitor the survey progress, While the survey team is only able to collect data and does not have any editing rights on the data. If any discrepancy needs to be addressed, the same request is made via the General Manager to the survey team. The survey data is saved on KoBo servers.

2533_field survey_final

2533_field survey_final

Welcome

Field survey for Project 2533- Improved cookstove program by SDG13 in India

* 2. Name of household representative

3. Mobile no

* 1. Record your current location

Start GeoPoint

Fig- KoBo Collect App

Sample Plan:

The monitoring plan is designed to monitor the parameters listed in monitoring plan of registered PD, which are required for calculation of the actual GHG emission reduction achieved by the project activity using ex post sampling survey. The share of operating stoves and the continued use of pre-project devices is being determined based on sampling procedures.

No monitoring for leakage through competitive uses of biomass is required, as the parameter wood usage is multiplied by 95% to account for leakage.

The survey team comprises Grameen Sahayaks (GS), Cluster Incharges (CI) and Project Managers (PM). Training is provided to the team before commencing the survey exercise. This training ensures that the team understands the objective of the survey exercise, delivery of the survey, the cultural sensitivities of the local area, and the tools used to conduct the survey. Surveys are conducted on KoBo Collect App by the survey team. The results are continuously monitored and validated by a Data Management Team. The Data Management team comprises data verification officers, led by the General Manager of the project. They ensure that all the data is properly collected and any anomaly is addressed. To ensure data authenticity and integrity, the login details of KoBo toolbox are only with the General Manager.

As per the Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, the sampling plan is the following:

(a) Sampling Design

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

(i) Objective and Reliability Requirements:

The objective is to obtain an unbiased and reliable estimate of the proportion or mean value of the following key variables over the course of the crediting period. As per CDM Methodology AMS-II.G, 90/10 confidence/precision is applied for annual sampling requirement and 95/10 for biennial sampling inspection. As per Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities, 90/10 confidence/precision to be adopted for small-scale project and 95/10 for large-scale project. Given that the size of the project is under the category of large projects, hence 95/10 confidence/precision is adopted for all parameters unless the average annual emission reductions of the project below the threshold

Monitored Parameter:

Parameter	Description	Parameter type/Frequency
$N_{y,i,j}$	Number of project devices of type i and batch j operating during year y	Proportion/Biennially
$\mu_{y,i,j}$	Adjustment to account for any continued use of pre-pre-project devices during the year y	Proportion/Biennially
$B_{y=1,new,i,j,survey}$	Quantity of woody biomass used by project devices in tonnes per device of type i and batch j	Mean value

(ii) Target Populations:

- The target population for the proportion of ICS still in operation ($N_{y,i,j}$ and $\mu_{y,i,j}$) of this project are all households in the project database which are using fuel wood in ICS distributed under the project for cooking.
- The target population for pre project appliances ($\mu_{y,i,j}$) is the set of old stoves still in use under the project database.

(iii) Sampling Frame

To ensure the homogeneity of the project instances included for a single sampling plan, two sampling frames shall be defined. Overall, all project instances will have same group of end users which is from households from rural/semi-urban areas. The projects are to be implemented in rural/semi-urban areas; thus, it is expected that the geographical locations do not have influence on the parameter of interest. Therefore, all above mentioned 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.

1) Sampling frame for proportion of ICS in operation ($N_{y,i,j}$)

The sample frame refers to all the information sources on the Database. There are two primary mechanisms for data collection: the Registration Process for newly distributed/installed ICS and the Monitoring Survey (which includes a household questionnaire and visual inspection of ICSs) that will be used throughout the lifetime of the ICS. The detailed information collected from Registration Process is used to populate the stoves Database and the Monitoring Survey follows “Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 04.

As explained below (on section “Sampling Method”), to take the different characteristics of different project instances Implemented and ICS models into consideration, Project instances shall be grouped together to create a Primary Sampling Unit, which is homogenous. As per EB 86 Annex 04, Appendix-2, paragraph 1, for the use of a single sampling plan covering a group of projects, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation, a 95/5 confidence/precision is applied for biennial sampling.

The first step is to identify the Primary Sampling Units. Primary sampling units are project instances, which have:

1. The same ICS models

That is project with the same ICS model can therefore be grouped together and form a Primary Sampling Unit. In case project has two different ICS models being implemented – this will form two Primary Sampling Units. This is justified by the fact that project might vary in terms of performance and it is important for the PP to collect and monitor accurate data for each stove model.

2) Adjustment to account for any continued use of pre-project devices during the year ($\mu_{y,i,j}$)

In line with applied approved methodology AMS-II.G, as installing data logger is not practical and if any use of pre project device can be monitored in a common survey with other monitoring parameters; therefore, a random sub-sample within the common survey can be taken to determine continued use of old cookstoves and its proportional usage by including suitable questionnaire.

There will be two situations 1) project ICS are completely discarded 2) the old stoves used along with project ICS.

Hence in first case it will be simple multiplication of fraction of total number of project ICS displaced by old cookstoves by total number of cookstoves in project, to achieve precise results based on survey result sample size calculation can be repeated.

However, for second case, surveys may be conducted if the use of data loggers to record the continued operation of baseline devices is demonstrated to be not practical, for example when the baseline device is the three-stone fire. The surveys should be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to determine the frequency of usage of both the project devices and baseline devices. For example, if there were 3 pre-project devices per household and it was determined during the survey that use of one of them continues during the crediting period then a conservative adjustment factor of 0.66 is applied for the relevant monitoring period. Another example would be the case where there was only one pre-project device per household and its use during the project period continues along with the project stove to meet 25% of the cooking needs of the household in which case the adjustment factor will be 0.75. Where a more precise data is available i.e. the thermal capacity of the project and pre-project devices and respective utilization hours, a weighted average adjustment factor may be used.

3) Quantity of woody biomass used by project devices in tonnes per device of type i and batch j ($B_{y=1,new,i,j,survey}$)

As mentioned above the either separate sampling can be done for this parameter or can be clubbed with sampling of above parameters, wherein interview question to be included to determine the average fuel wood used by the project device.

(iv) Sampling Method

The sampling method for monitored parameters $N_{y,i,j}$, and $\mu_{y,i,j}$ is Simple Random Sampling and samples are randomly selected from the primary sampling units. To ensure a random selection of ICS, random number generators is applied. Each ICS in the target population is uniquely identifiable by its unique ID number. Each ICS can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of ICS in the Database for that pre-defined sampling frame. Applying the random number generators, the ICS can then be randomly chosen from the defined population up to the required sample size as calculated by the PP.

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

$N_{y,i,j}$: 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)

$\mu_{y,i,j}$: Pre project device only is in use then fraction to be used to calculate total number, however if pre project device is used along with project ICS, proportion of usage of each will be determined by cooking habits evaluated by survey questionnaire during the monitoring period.

$B_{y=1,new,i,j,survey}$: Quantity of woody biomass used by project devices in tonnes per device (first year of installation)

(v) Sample Size

As the For the estimation of the proportion or mean value of the parameters investigated, the minimum sample size for each sample frame has to achieve the 95/10 confidence/precision for annual and 95/5 confidence/precision for biennial sampling.

There are three parameters that will be estimated through sampling: the number of stoves still in operation during the monitoring period as determined by the monitoring survey ($N_{y,i,j}$), Quantity of woody biomass used by project devices in tonnes per device ($B_{y=1,new,i,j,survey}$) and the continued use of old stoves, ($\mu_{y,i,j}$).

In line with sampling guidelines, all can be sampled in a single survey with a random sample of households using the above described confidence/precision levels. The $N_{y,i,j}$ and $\mu_{y,i,j}$ requires proportion/percentage parameters, however the wood consumption by ICS may have variation and is a mean value.

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 07.0 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.

The final sample size for the project activity is calculated based on sample survey, based on survey results the sample size is calculated.

To estimate the sample size for parameters $N_{y,i,j}$ and $\mu_{y,i,j}$ the following equation is used:

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

Where:

n = Sample size

N = Population size (29, 860)

p = Expected proportion (95%)

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

Sample size calculation:

Parameter $N_{y,i,j}$ & $\mu_{y,i,j}$: Based on the above values, the resulting sampling size for a 95/10 confidence/precision is calculated as:

$$n \geq \frac{1.96^2 \times 29,860 \times 0.95 (1-0.95)}{(29,860-1) \times 0.1^2 \times 0.95^2 + 1.96^2 \times 0.95 (1-0.95)}$$

Which comes out to be

$$n \geq 19.19$$

$$n = 20$$

Therefore, in this case a sample size of 20 is to be sampled from primary sampling unit.

However, as the resulting sample size to achieve the desired confidence/precision levels is smaller than 30 ICS, a minimum sample size of 30 to be considered when the parameter of interest is a proportion in line with para 14 of Standard: Sampling and surveys for CDM project activities and programmes of activities, Version-09. However, the PP has considered 180 sample, which is conservative.

Parameter $B_{y=1,new,i,j,survey}$:

To estimate the sample size for parameter $B_{y=1,new,i,j,survey}$ the following equation is used:

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

Where,

$$V = (SD/mean)^2$$

n = Sample size

N = Population size (Total number of households)

Mean= Expected mean of biomass usage (tonne/ICS)

SD = Expected standard deviation

1.96 = Represents the 95% confidence required

0.1 = Represents the 10% relative precision

As per survey and KPT conducted the values estimated as below

Standard Deviation = 0.7285

Mean Value=3.358

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

$$n \geq \frac{1.96^2 \times 29,860 \times (0.7285/0.3.358)^2}{(29,860-1) \times 0.1^2 + 1.96^2 \times (0.7285/0.3.358)}$$

Using above values, the sample size comes out to be 18.7 or 19. However, the PP has considered 180 sample, which is conservative.

The all three parameters of interest sampled in a single survey as the installed device is homogenous in nature and the user of the ICS also have same climate.

Further to confirm on the required confidence level/precision of sample, the sample size calculated based on confidence interval and precision level required as per registered PD for population size is 20 for $N_{y,i,j}$ & $\mu_{y,i,j}$ and 19 for $B_{y=1,new,i,j,survey}$, however actual sample size taken as 180, which is conservative.

Moreover, to check reliability/compliance mean value and standard deviation is calculated for samples, which indicates the precision level of 3.19% for wood fuel consumption at 95% confidence level is acceptable and appropriate.

The project activity has achieved 3.19% precision level at 95% confidence interval.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The project activity has disseminated improved cookstove to individual households as energy efficiency measure, therefore equations 1 and 2 of the methodology is applied to calculate the net GHG emission reductions.

$$ER_y = \sum_i \sum_j ER_{y,i,j} \dots \dots \dots \text{Equation (1)}$$

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

Where,

ER_y = Emission reductions during year y in tCO_2e

$ER_{y,i,j}$ = Emission reductions by improved cookstove of type i and batch j during year y in tCO_2e

and;

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

$B_{y,savings,i,j}$ = Quantity of woody biomass that is saved in tonnes per improved cook stove of type i and batch j during year y

$NCV_{wood\ fuel}$ = Net calorific value of the non-renewable woody biomass that is substituted or reduced (TJ/tonne)

$fNRB$ = Fraction of woody biomass that can be established as non-renewable biomass (fraction)

EF_{wf,CO_2} = CO_2 emission factor for the use of wood fuel in baseline scenario (tCO_2/TJ)

$EF_{wf,non\ CO_2}$ = Non- CO_2 emission factor for the use of wood fuel in baseline scenario (tCO_2/TJ)

$N_{y,i,j}$ = Number of improved cook stoves of type i and batch j operating during year y

0.95 = Discount factor to account for leakage

The quantify of woody biomass saved $B_{y,savings,i,j}$ due to implementation of improved cook stoves is estimated by the following Equations:

$$B_{y,savings,i,j} = B_{y=1, new,i,survey} \times ((\eta_{new,i,j}/\eta_{old})-1) \dots \dots \dots \text{Eq.4}$$

Where,

η_{old} = Efficiency of baseline cookstove (fraction)

$\eta_{new,i,j}$ = Efficiency determined using Equation 5 of applied approved methodology (%)

$B_{y=1, \text{ new}, i, \text{ survey}}$ = Annual quantity of woody biomass used by improved cook stoves 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 (tonnes/year/stove)

Where the project households continue to use baseline cookstoves along with improved cookstoves, B_{old} shall be adjusted ex-post based on the percentage of project households found to continue such practice according to the following equation.

$$B_{\text{old, adjusted}} = B_{\text{old}} \times (1 - \mu_y)$$

Where,

$B_{\text{old, adjusted}}$ = Adjusted B_{old} to account the ex post usage of firewood in baseline cookstove(s) by project households in addition to improved cookstove (in tonnes per device)

μ_y = Baseline stove usage factor to account for use of baseline cookstoves along with improved cookstoves

The project activity involves distribution of only one type i.e. Greenway Jumbo Cookstoves and all ICS under project considered for emission reduction calculation being distributed from 01st January 2022 to 30 April 2022.

Parameter	Unit	Value	Source
$N_{y, i, j}$	Number	29,860	Distribution record by project proponent from 09 October 2021 to 30 April 2022
$NCV_{\text{wood fuel}}$	TJ/Tonne	0.0156	IPCC default value for wood fuel
f_{NRB}	fraction	0.901	As per registered PD
$EF_{\text{wf, non CO}_2}$	tCO ₂ e/TJ	26.23	IPCC default value for wood fuel
$EF_{\text{wf, CO}_2}$	tCO ₂ e/TJ	112	IPCC default value for wood fuel
η_{old}	fraction	10%	Default value as per VMR0006
$\eta_{\text{new}, i, j}$	fraction	35.7%	Calculated as per equation 5 of VMR0006
$B_{y=1, \text{ new}, i, \text{ survey}}$	Tonne/HH/year	1.245	As per survey report and KPT conducted from 28 June 2022 to 31 August 2022.
$B_{y, \text{ savings}, i, j}$	Tonne/HH/year	3.20214	Calculated

μ_y	fraction	0.895	As per survey report conducted from 28 June 2022 to 31 August 2022.
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The emission reduction is calculated as below for ICS installed from 01 January 2022 to 30th April 2022, which is considered commissioning of first batch, onwards ICS installed on daily basis considered as a batch and emission reduction is calculated based on number of days of operation

$$\begin{aligned}
 ER_{y,l,j} &= B_{y,savings,i,j} \times NCV_{wood\ fuel} \times fNRB \times (EF_{wf,CO_2} + EF_{wf,non\ CO_2}) \times N_{y,l,j} \times 0.95 \\
 &= 3.20214 \times 0.0156 \times 0.901 \times (112 + 26.23) \times 5,650 \times 0.95 \times (120/365) \\
 &= 10,978.74 \times 0.895 \text{ (0.895 is the } \mu_y \text{ as per survey)} \\
 ER_y &= 9,828.23 \text{ tCO}_2\text{e (for 5650 ICS 120 days)}
 \end{aligned}$$

The emission reduction calculation for remaining ICS can be checked from ER sheet.

5.2 Project Emissions

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

5.3 Leakage

Leakage is already accounted in calculation of emission reduction by adjusting with default value of 0.95.

5.4 Net GHG Emission Reductions and Removals

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)
01-January-2022 to 30-April-2022	29,603	0	0	29,603
Total	29,603	0	0	29,603

<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
39,043	29,603	24.18%	The emission reduction during current monitoring period i.e. 01 January 2022 to 30 April 2022 (120 days) is 24.18% lower than estimated ex-ante in registered PD. The difference is mainly due to the actual wood fuel consumption that resulted from the KPTs. The value was slightly lower than the ex-ante assumed value. In addition, there was continued use of baseline stove