DISTRIBUTION OF IMPROVED COOK STOVE - PHASE 14

Document Prepared by EKI Energy Services Limited

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Project Title	Distribution of Improved cook stove - Phase 14
Version	03
Report ID	VVER 344
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Project ID	VCS 2428
Monitoring Period	04-October-2012 to 03-October-2017 (First and Last date included)
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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity (usage of improved cook stoves) has been deployed to facilitate clean cooking practice and reduce health risk due to indoor air pollution[1] along with reduction of drudgery amongst the tribal households (Schedule Tribe) and families living below the poverty level (BPL category[2]) across Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts which lies in Aurangabad, Amravati and Nagpur Divisions of Maharashtra. The usage of improved cook stoves through replacement of inefficient traditional cook stove contributes towards reduction of greenhouse gas emission, reduction of by-products of incomplete combustion like black carbon and conservation of fuel wood resulting in prevention of forest degradation. The higher efficient portable, single pot improved cook stoves distributed under the project activity has changed the prevailing practice of usage of traditional cook stoves across selected households in rural areas across selected households in rural areas of Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts of Maharashtra who are provisioned with improved cookstoves under the project activity.

It is worthwhile to note that firewood and wood chips contributes as major cooking fuel amongst rural households in India. According to the NSSO[3] 61st round survey, a considerable percentage of rural population of Maharashtra relies upon fire wood for cooking and the percentage is substantially much higher amongst the lower MPCE (Monthly Per Capita Expenditure) group. Since, the beneficiary selected under the project belongs to BPL and ST category of population in terms of capacity of expenditure therefore; improved cook stove use results in substantial fuel wood saving as this section is the major consumer of fuel wood.

The improved cook stoves distributed under the project activity are more efficient with thermal efficiency of 29.88%[4] as compared to traditional stoves with thermal efficiency of around 10%[5]. Owing to higher efficiency, use of efficient improved cook stove results in reduced consumption of non-renewable biomass in compared to baseline by minimizing

[1] Household Cook stoves, Environment, Health and Climate Change – World Bank (Executive summary, page 9-11)
[2] As per the article in The Hindu (http://www.thehindu.com/news/national/article3013870.ece) dated March 20, 2012 anyone with daily consumption expenditure below Rs. 22.42 is categorised under BPL. The article depicts of 24.5% of the total population in Maharashtra under BPL in 2009-10.
[3]National Sample Survey Office

[4] Thermal Efficiency Test Report of Improved Cook stove tested at Biomass Cook stove Testing Centre, Dept. of Renewable Energy Sources, Udaipur
[5] Paragraph 6 (Option 2) of approved applicable methodology AMS –II.G., Version 03

thermal energy losses and facilitating complete combustion. Reduced consumption/ combustion of non-renewable biomass results in reduction of GHG emission.

Technology Employed

The cook stove deployed under the project activity[6] is single pot, portable, metallic, improved biomass cook stoves[7] made of cast iron for combustion of solid biomass. The improved cook stoves are manufactured in accordance to IS 13152, Part-1: 1991, CPRI Design Type I[8] standard. The design ensures complete combustion of biomass. The cook stove is tested for thermal efficiency (29.88%) as per water boiling test protocol specified in IS 13152, Part 1: 1991.

Measures undertaken

The Rural Development and Water Conservation (RDWC) Department, Government of Maharashtra is involved in promoting betterment of living standard for the tribal household (ST) and families living Below Poverty Line (BPL) in villages of Maharashtra. The department as a part of its aforesaid programme selects households from amongst the ST and BPL category depending upon level of vulnerability (assessed on basis of 13 parameters: Category and size of usable land, Type of house, Availability of regular usable clothes, Protection of food or food security, Cleanliness, Ownership of required goods, Heights /Level of literacy, Family working capacity, Source of livelihood goods, Number of children in age group (5 to 14), Type of bankruptcy, reason for staying away from family of Earning member, Choice of help /Yojana)[9] and provide financial assistance to facilitate better and hygienic living standard. The household selected for financial assistance under the programme is provided with an improved cook stove system. The household considered as end users of cook stoves under the project activity are poor enough to afford for procurement of improved cook stoves and are also least interested towards similar investment as wood is available for free. So, in absence of the improved cook stove disseminated under the project activity the household would have continued with use of traditional cook stoves. Since, the project activity is conceived under the program of Govt. of Maharashtra which provides cook stove only to BPL and ST category household so; there is no chance of cook stove to be distributed to non-baseline household. The identification of beneficiaries and distribution of cook stoves comes under the preview of the Rural Development and Water Conservation Department.

The project activity includes dissemination of 14,517 Nos. improved cook stoves[10] amongst Below Poverty Line (BPL) and Scheduled Tribes (ST) households in rural areas of Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts which lies in Aurangabad, Amravati and Nagpur Divisions of Maharashtra

6 Manufactured by Vikram Stoves and Fabricators (Ministry of New and Renewable Energy) approved manufacturer and distributor of improved cook stoves) selected by RDWC Department, Government of Maharashtra for distribution of improved cook stoves amongst identified beneficiaries.
7 MNRE accredited system -http://mnre.gov.in/schemes/decentralized-systems/national-biomass-cookstoves- initiative/
8 The design of the cook stove is certified by Bureau of Indian Standards relating to its appropriateness to, IS 13152 (Part1).
9 Criteria issued by Department of rural Development, Government of Maharashtra
10 Each of the cook stoves is included for the purpose of emission reduction calculation from the day on which it is distributed to the beneficiary and the end user agreement is signed.

upon signing of the end user Tripartite Agreement[11]. The project through conservation of non-renewable biomass was estimated to result in an greenhouse gas emission reduction of 13,050 tCO_2e annually (ex-ante).

The revenue from carbon financing was conceived in deciding upon the capital cost as well as to meet up the cost towards imparting awareness and training, periodic maintenance[12] and post lifetime replacement within the crediting period.

The amount of emission reductions achieved for the current monitoring period is 61,559 tCO_2e.

The start date of the project activity is 04-October-2012. Since the project activity of improved cook stove usage by the end user does not require any construction or significant pre-project implementation, nor financial commitment on the part of end user therefore the real action pertaining to the earliest date of distribution of improved cook stoves under the project activity is considered as the start date as per project start date definition of section 3.7 of the VCS Standard V.4.1.

1.2 Sectoral Scope and Project Type

- Sectoral Scope: 3- Energy demand
- Project Type: Type II.G.

The project activity fulfills the applicability criteria of small- scale project activity, Type II – Energy Efficiency Improvement Projects, Category G –'Energy efficiency measures in thermal applications of non-renewable biomass' of the 'Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-scale Project Activity Categories'.

This is non-AFLOU type of project

1.3 Project Proponent

Organization name	M/s G K Energy Marketers Pvt. Ltd
Contact person	Mr. Gopal Kabra
Title	Authorized Signatory
Address	Lokmanya Nagar, LBS Road, Flat No.- 350, Building No.- 25,Ground Floor, Pune, Maharashtra – 411030 India
Telephone	+91-997045
Email	gopal@energymarketers.in

11 Tripartite Agreement is for transfer the emission reduction right to the Project Participant by each beneficiaries/end users and is signed amongst end user, GKEMPL and Vikram Stoves. The tripartite agreement authorizes M/s G K Energy Marketers Pvt. Ltd (hereafter referred to as GKEMPL) by Vikram Stoves (manufacturer of improved cook stoves) and the end users for securing of carbon finance

12 "The Indian stove programme: an insider's view – the role of society, politics, economics and education" by Bhaskar Sinha, National Institute of Science, Technology & Development Studies (NISTADS), CSIR, New Delhi outlines that the woman are least interested for maintenance as they do not perceive the usefulness of the stove and revert back to traditional practice when the cook stove becomes non-functional therefore timely operation and maintenance are vital.

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Mr. Pankaj Rajpoot
Title	Assistant Manager- Operations
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
Telephone	+91- 7828347589
Email	registry@enkingint.org

1.5 Project Start Date

The start date of the project activity is 04-October-2012.

The project activity relating to improved cook stove usage by the end user does not require any construction or significant pre-project implementation, nor financial commitment on the part of end user. The real action pertaining to the earliest date of handover of improved cook stoves to beneficiary (also considered as date of onset of GHG emission reductions) under the project activity is considered as the start date as per project start date definition under paragraph 3.7 of the VCS Standard.

The date of supply/ receipt of first lot of improved cookstoves from manufacturer to the regional office of the line department was considered as start date under the CDM registered PDD (evidenced through acknowledgement of the delivery receipt of the line department) as per CDM definition of Start Date. The start date referred to in the registered CDM-PDD was mirrored in the VCS PD(listed). Since the date does not resembles to handover of the cookstoves to beneficiary and does not result in onset of actual emission reduction therefore the same was not considered as start date under VCS mechanism and therefore revised with date of distribution/ handover of improved cookstoves to beneficiary.

1.6 Project Crediting Period

The crediting period of the project activity is for 10 years (Fixed).
The length of the first crediting period 04-October-2012 to 03-October -2022(both dates inclusive). The cookstoves are distributed between 04-October-2012 to 16-December-2012 to 14,517 beneficiary households.
As per errata and clarification, a project is deemed to have met the timelines where Verra confirmed (in writing, to the project proponent or an authorized representative) the project's eligibility on or before 4-February-2021.The listing process has been completed before 04-February-2021 and hence the errata and clarifications are not applicable

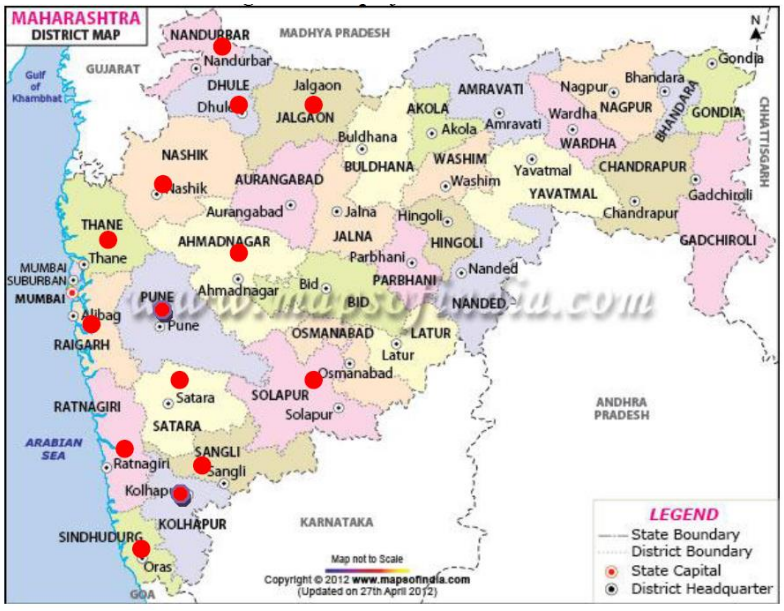
1.7 Project Location

The project is located in state Maharashtra, India.

The list of division is given below:
Division: Aurangabad
Districts: Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur
Division: Amravati
Districts: Buldhana, Akola, Washim, Amravati and Yavatmal
Division: Nagpur
Districts: Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia

Division	District	Latitude	Longitude
Aurangabad	Aurangabad	19.00 - 20.00^{O} N	74.00 -76.00^{O} E
	Jalna	19.10 - 21.30^{O} N	75.40 - 76.40^{O} E
	Parbhani	18.45 – 20.10^{O} N	76.13 – 77.39^{O} E
	Hingoli	19.43^{O} N	77.11^{O} E
	Bheed	18.30- 19.30^{O} N	74.50 - 76.60^{O} E
	Nanded	18.25 - 19.91^{O} N	77.00 - 78.41^{O} E
	Osmanabad	17.35 - 18.40^{O} N	75.16 – 76.40^{O} E
	Latur	17.75 – 18.75^{O} N	76.25 - 77.25^{O} E
Amravati	Buldhana	19.85 – 21.28^{O} N	75.95 – 76.81^{O} E
	Akola	19.85 –21.26^{O} N	76.63 - 77.73^{O} E
	Washim	19.61 - 21.16^{O} N	76.70 – 77.40^{O} E
	Amravati	20.53 - 21.76^{O} N	76.61 - 78.45^{O} E
	Yavatmal	19.26 - 20.42^{O} N	77.18 - 79.98^{O} E
Nagpur	Wardha	20.30 - 21.35^{O} N	78.06 - 79.25^{O} E
	Nagpur	20.35 - 21.44^{O} N	75.15 - 79.40^{O} E
	Bhandara	20.65 - 21.63^{O} N	79.45 - 80.70^{O} E
	Chandrapur	18.40 - 20.50^{O} N	78.50 - 80.60^{O} E
	Ghadchiroli	18.43 - 21.50^{O} N	79.45 - 80.53^{O} E
	Gondia	20.39 - 21.38^{O} N	79.27 - 80.42^{O} E

Map of India



Map of Maharashtra


AURANGABAD
DISTRICT MAP
JALGAON
NASHIK
JALNA
AHMADNAGAR
BULDANA
Khuldabad
AURANGABAD
Vaijapur
Gangapur
Kannad
Sillod
Soegaon
Phulambri
Paithan
Gangapur
Sillod
Aurangabad
Jalna
Ahmednagar
Buldana
Nashik
Jalgaon
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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JALNA
DISTRICT MAP
JALGAON
AURANGABAD
BULDANA
PARBHANI
BEED
AHMADNAGAR
Jafrabad
Ambad
Partur
Ghansawangi
Jalna
Aurangabad
Parbhani
Beed
Ahmednagar
Buldana
Jalgaon
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
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Other Town
Major Town
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PARBHANI
DISTRICT MAP
HINGOLI
JALNA
NANDED
BEED
Jintur
Sailu
Pathri
Purna
Gangakher
Sonpeth
Parbhani
Hingoli
Nanded
Jalna
Beed
Latur
Osmanabad
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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HINGOLI
DISTRICT MAP
WASHIM
YAVATMAL
PARBHANI
NANDED
HINGOLI
Kalamnuri
Basmath
Sengaon
Aundha
Hingoli
Nanded
Parbhani
Yavatmal
Washim
LEGEND
National Highway
Major Road
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State Boundary
River
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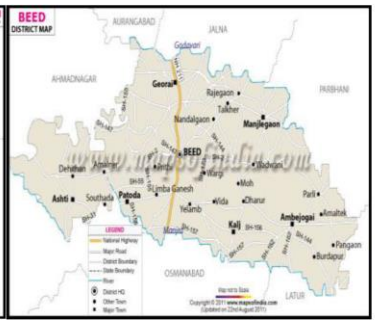
BEED
DISTRICT MAP
AURANGABAD
JALNA
AHMADNAGAR
PARBHANI
OSMANABAD
LATUR
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Kaij
Ambejogai
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Aurangabad
Jalna
Ahmednagar
Parbhani
Osmanabad
Latur
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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NANDED
District Map
YAVATMAL
HINGOLI
PARBHANI
LATUR
ANDHRA PRADESH
KARNATAKA
Kinwat
Hadgaon
Bhokar
Nanded
Mukhed
Kandhar
Deglur
Hingoli
Nanded
Parbhani
Yavatmal
Latur
Osmanabad
LEGEND
State Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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OSMANABAD
DISTRICT MAP
SOLAPUR
LATUR
KARNATAKA
OSMANABAD
Paranda
Bhum
Kallam
Tuljapur
Omerga
Latur
Osmanabad
Solapur
Karnataka
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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LATUR
DISTRICT MAP
PARBHANI
NANDED
BEED
OSMANABAD
KARNATAKA
Ahmadpur
Udgir
LATUR
Ausa
Nilanga
Chakur
Renapur
Latur
Osmanabad
Karnataka
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
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Major Town
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BULDHANA
DISTRICT MAP
MADHYA PRADESH
JALGAON
JALNA
AKOLA
WASHIM
AMRAVATI
Malkapur
Khamgaon
BULDHANA
Chikhli
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Amravati
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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AKOLA
DISTRICT MAP
AMRAVATI
BULDANA
YAVATMAL
WASHIM
Akot
AKOLA
Balapur
Barsi Takli
Murtajapur
Akola
Amravati
Buldana
Yavatmal
Washim
LEGEND
National Highway
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Railway
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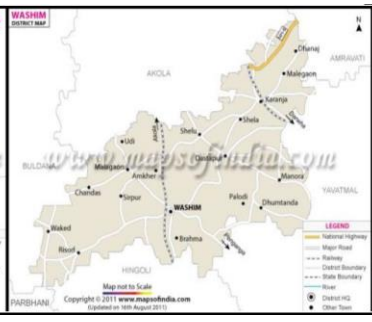
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Risod
WASHIM
Washim
Akola
Amravati
Buldana
Yavatmal
Hingoli
Parbhani
LEGEND
National Highway
Major Road
Railway
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State Boundary
River
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Other Town
Major Town
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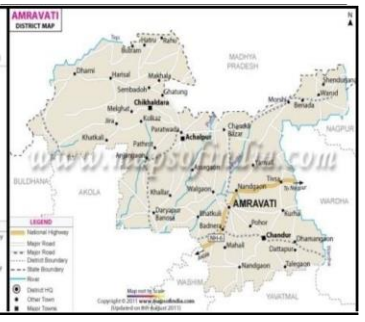
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AKOLA
WARDHA
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Dharni
Amravati
Buldana
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Wardha
Nagpur
LEGEND
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Railway
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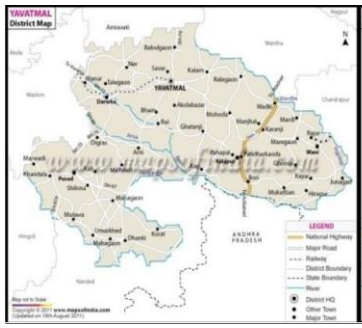
YAVATMAL
District Map
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Andhra Pradesh
LEGEND
National Highway
Major Road
Railway
District Boundary
State Boundary
River
District HQ
Other Town
Major Town
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WARDHA
DISTRICT MAP
NAGPUR
AMRAVATI
YAVATMAL
CHANDRAPUR
WARDHA
Hinganghat
Arvi
Pulgaon
Seloo
Wardha
Nagpur
Amravati
Yavatmal
Chandrapur
LEGEND
National Highway
Major Road
Railway
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River
District HQ
Other Town
Major Town
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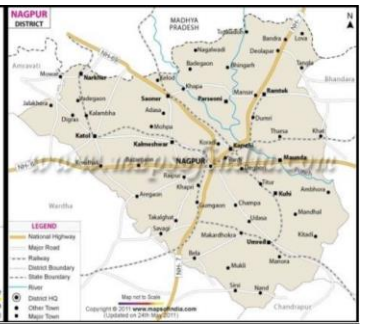
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National Highway
Major Road
Railway
District Boundary
State Boundary
River
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Major Town
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Map of Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia

Aurangabad			Jalna		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Adharwadi	Sillod	1	Kathora	Bhokardan
2	Ajantha	Sillod	2	Kathora bajar	Bhokardan
3	Ambhai	Sillod	3	Kedarkheda	Bhokardan
4	Amsari	Sillod	4	Khadgaon	Bhokardan
5	Amthana	Sillod	5	Khadki	Bhokardan
6	Islampurwadi	Aurangabad	6	Khamkheda	Bhokardan
7	Jadgaon	Aurangabad	7	Khandala	Bhokardan
8	Jaipur	Aurangabad	8	Khaparkheda	Bhokardan
9	Jalgaon Feran	Aurangabad	9	Koda	Bhokardan
10	Jatwada	Aurangabad	10	Kodoli	Bhokardan
11	Itawa	Gangapur	11	Kolegaon	Bhokardan
12	Jambhala	Gangapur	12	Koparda	Bhokardan
13	Jamgaon	Gangapur	13	Kosgaon	Bhokardan
14	Jikthan	Gangapur	14	Kota dabhadi	Bhokardan
15	Jogeshwari	Gangapur	15	Kotha jahagir	Bhokardan
16	Kaigaon	Gangapur	16	Kotha koli	Bhokardan
17	Kalegaon	Gangapur	17	Kshirsagar	Bhokardan
18	Kamlapur	Gangapur	18	Kukdi	Bhokardan
19	Kankori	Gangapur	19	Kumbhari	Bhokardan
20	Kasoda	Gangapur	20	Latifpur	Bhokardan

Aurangabad			Jalna		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
21	Katepimpalgaon	Gangapur	21	Leha	Bhokardan
22	Khadak Narala	Gangapur	22	Lingewadi	Bhokardan
23	Khadak Waghalgaon	Gangapur			

Parbhani			Hingoli		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Akoli	Jintur	1	Adgaon	Hingoli
2	Ambarwadi	Jintur	2	Ambala	Hingoli
3	Angalgaon	Jintur	3	Ambheri	Hingoli
4	Angalgaon Tanda	Jintur	4	Amla	Hingoli
5	Akoli	Gangakhed	5	Andharwadi	Hingoli
6	Anand Nagar	Gangakhed	6	Atharwadi	Hingoli
7	Anandwadi	Gangakhed	7	Balsond	Hingoli
8	Anandwadi	Gangakhed	8	Basamba	Hingoli
9	Adgaon lasina	Purna	9	Belura	Hingoli
10	Adgaon sugaon	Purna	10	Belwadi	Hingoli
11	Aherwadi	Purna	11	Bhandegaon	Hingoli
12	Ajdapur	Purna	12	Bhatsawangi	Hingoli
13	Alegaon	Purna	13	Bhatsawangi Tanda	Hingoli
14	Avhai	Purna	14	Bhingi	Hingoli
15	Balsa bk.	Purna	15	Bhirda	Hingoli
16	Banegaon	Purna	16	Akhada Balapur	Kalamnuri
17	Barbadi	Purna	17	Arati	Kalamnuri
18	Bhategaon	Purna	18	Asola	Kalamnuri
19	Changephal	Purna	19	Asolwadi	Kalamnuri
20	Chudawa	Purna	20	Babhali	Kalamnuri
21	Dagadwadi	Purna	21	Baur	Kalamnuri
22	Dastapur	Purna	22	Belmanda	Kalamnuri
23	Degaon	Purna	23	Belthar	Kalamnuri
24	Deulgaon Dhudhate	Purna	24	Bhategaon	Kalamnuri
25	Devthana	Purna	25	Bhosi	Kalamnuri
			26	Bhurkyachiwadi	Kalamnuri

Beed			Nanded		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Adpimpri	Georai	1	Chinchalwadi	Mukhed
2	Agar Nandur	Georai	2	Chinchgaon	Mukhed
3	Aher Vahegaon	Georai	3	Chivli	Mukhed
4	Amla	Georai	4	Chondi	Mukhed
5	Ankota	Georai	5	Dabka Raja	Mukhed
6	Antarvali Bk.	Georai	6	Dapka Gundopant	Mukhed
7	Ardhapimpri	Georai	7	Degaon	Mukhed

Beed			Nanded		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
8	Ardhmasla	Georai	8	Dhamangaon	Mukhed
9	Aurangpur Kukada	Georai	9	Dhanaj	Mukhed
10	Babultara	Georai	10	Dongargaon	Mukhed
11	Bagpimpalgaon	Georai	11	Dornali	Mukhed
12	Barhanpur	Georai	12	Eklara	Mukhed
13	Belgaon	Georai	13	Futtala Tanda	Mukhed
14	Belgudwadi	Georai	14	Gadgyalwadi	Mukhed
15	Bhadangwadi	Georai	15	Gojegaon	Mukhed
16	Bhat Antarwali	Georai	16	Gonegaon	Mukhed
17	Bhatepuri	Georai	17	Halni	Mukhed
18	Bhend Bk.	Georai	18	Hangarga Kh.	Mukhed
19	Bhend Kh.	Georai	19	Hangarga P.K.	Mukhed
20	Bhend Takli	Georai	20	Hasnal	Mukhed
21	Bhogalgaon	Georai	21	Hasnal	Mukhed
22	Bhojgaon	Georai	22	Hatral	Mukhed
23	Borgaon Bk.	Georai	23	Hibbat	Mukhed
			24	Kamtha Kh.	Nanded
			25	Kasarkheda	Nanded
			26	Khadki	Nanded
			27	Khadkut	Nanded
			28	Khupsarwadi	Nanded

Osmanabad			Latur		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Bijanwadi	Tuljapur	1	Gaur	Nilanga
2	Bolegaon	Tuljapur	2	Girakchal	Nilanga
3	Borgaon	Tuljapur	3	Gunewadi	Nilanga
4	Bori	Tuljapur	4	Gunjarga	Nilanga
5	Bornadwadi	Tuljapur	5	Gurhal	Nilanga
6	Bornadwadi	Tuljapur	6	Hadga	Nilanga
7	Chavhanwadi	Tuljapur	7	Hadoli	Nilanga
8	Chikundra	Tuljapur	8	Hagranga	Nilanga
9	Chincholi	Tuljapur	9	Haidarwadi	Nilanga
10	Chivari	Tuljapur	10	Halgara	Nilanga
11	Dahitna	Tuljapur	11	Hallali	Nilanga
12	Dahiwadi	Tuljapur	12	Halsi Tugaon	Nilanga
13	Deokurli	Tuljapur	13	Halsi [ha]	Nilanga
14	Deosinga	Tuljapur	14	Hanchnal	Nilanga
15	Devsinga Nal	Tuljapur	15	Handral	Nilanga
16	Dhanegaon	Tuljapur	16	Hanmantwadi	Nilanga
17	Dhangarwadi	Tuljapur	17	Hanmantwadi Halgara	Nilanga
18	Dhekri	Tuljapur	18	Hanmantwadi	Nilanga

Osmanabad			Latur		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
19	Dhotri	Tuljapur	19	Hanmantwadi [mugaon]	Nilanga
20	Dindegaon	Tuljapur	20	Harijawalga	Nilanga
21	Fulwadi	Tuljapur	21	Hasori Bk.	Nilanga
22	Ganjewadi	Tuljapur	22	Hasori Kh.	Nilanga
23	Gawalewadi	Tuljapur	23	Hattarga [halsi]	Nilanga
24	Ghandora	Tuljapur	24	Hosur	Nilanga
25	Ghattewadi	Tuljapur	25	Jajnur	Nilanga
26	Gondhalwadi	Tuljapur			
27	Gujnur	Tuljapur			
28	Gulhalli	Tuljapur			
29	Haglur	Tuljapur			
30	Hangarga	Tuljapur			
31	Hangarga	Tuljapur			
32	Hippargatad	Tuljapur			
33	Honala	Tuljapur			
34	Horti	Tuljapur			

Buldhana			Akola		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Afjalpur	Buldana	1	Borgaon	Akola
2	Ajispur	Buldana	2	Chachondi	Akola
3	Ambhoda	Buldana	3	Chandur	Akola
4	Antriteli	Buldana	4	Changefal	Akola
5	Atakal	Buldana	5	Chikhalgaon	Akola
6	Awalkhed	Buldana	6	Dabki	Akola
7	Bhadgaon	Buldana	7	Dahigaon	Akola
8	Bhadola	Buldana	8	Dahihanda	Akola
9	Birsingpur	Buldana			
10	Bodegaon	Buldana			
11	Borkhed	Buldana			
12	Borkhed	Buldana			
13	Chandol	Buldana			
14	Chautha	Buldana			
15	Chikhala	Buldana			
16	Dahid Bk.	Buldana			
17	Dahid Kh.	Buldana			
18	Dalsawangi	Buldana			
19	Dasalwadi	Buldana			
20	Dattapur	Buldana			
21	Deepur	Buldana			
22	Deulghat	Buldana			
23	Devhari	Buldana			

Buldhana			Akola		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
24	Dhad	Buldana			
25	Dhamangaon	Buldana			
26	Dhangarpur	Buldana			
27	Domrul	Buldana			
28	Dongar Khandala	Buldana			
29	Dudha	Buldana			
30	Girda	Buldana			
31	Gondhankhed	Buldana			

Washim			Amravati		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Hiwara Rohila	Washim	1	Bhilona	Achalpur
2	Ilakhi	Washim	2	Bhopapur	Achalpur
3	Jaipur	Washim	3	Bhopapur	Achalpur
4	Jambharun Jahagir	Washim	4	Bhugaon	Achalpur
5	Jambhrun Bhite	Washim	5	Bordi	Achalpur
6	Jambhrun Mahali	Washim	6	Borgaon Dori	Achalpur
7	Jambhrun Naoji	Washim	7	Borgaon Peth	Achalpur
8	Jambhrun Parande	Washim	8	Borgaon Talni	Achalpur
9	Jawala	Washim	9	Buradghat	Achalpur
10	Jumda	Washim	10	Chachondi	Achalpur
11	Kajlamba	Washim	11	Chamak Bk	Achalpur
12	Kakaddat	Washim	12	Chamak Kh	Achalpur
13	Kalamba Mahali	Washim	13	Chandura Jahagir	Achalpur
14	Kamathwada	Washim	14	Chausala	Achalpur
15	Kanadi	Washim	15	Devgaon	Achalpur
16	Karli	Washim	16	Dewari	Achalpur
17	Kata	Washim	17	Dhamangaon	Achalpur
18	Kekatumra	Washim	18	Dhamani	Achalpur
19	Khadsing	Washim	19	Dhotarkheda	Achalpur
20	Khandala Kh.	Washim	20	Donoda	Achalpur
21	Kharola	Washim	21	Ekalaspur	Achalpur
22	Kinkheda	Washim	22	Gaurkheda	Achalpur
23	Kokalgaon	Washim	23	Ghodgaon	Achalpur
24	Kondala Mahali	Washim	24	Gondvihir	Achalpur
25	Kondala Zamre	Washim			
26	Krishna	Washim			
27	Kumbharkhed	Washim			
28	Malegaon N.	Washim			

Yavatmal			Wardha		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Kaotha Bazar	Arni	1	Bhuigaon	Wardha
2	Kap	Arni	2	Bodad	Wardha
3	Karegaon	Arni	3	Borgaon	Wardha
4	Kathoda	Arni	4	Borgaon	Wardha
5	Kawtha Bk	Arni	5	Chaka	Wardha
6	Kelzara	Arni	6	Chichala	Wardha
7	Kelzara	Arni	7	Chikni	Wardha
8	Khadaka	Arni	8	Chitoda	Wardha
9	Khandala	Arni	9	Chunala	Wardha
10	Khed	Arni	10	Dahegaon Miskin	Wardha
11	Kinhi	Arni	11	Dattapur	Wardha
12	Kolwan	Arni	12	Degaon	Wardha
13	Kopara	Arni	13	Dhamangaon	Wardha
14	Kosadani	Arni	14	Dhanora	Wardha
15	Krishnanagar	Arni	15	Dhotra	Wardha
16	Kurha	Arni	16	Dhotra	Wardha
17	Kurha	Arni	17	Dhulwa	Wardha
18	Lingi	Arni	18	Digraj	Wardha
19	Lonbehal	Arni	19	Dorli	Wardha
20	Loni	Arni	20	Dorli	Wardha
21	Mahalungi	Arni	21	Ekurli	Wardha
22	Malegaon	Arni	22	Ganeshpur	Wardha
			23	Goji	Wardha
			24	Inzapur	Wardha
			25	Jamtha	Wardha
			26	Jaulgaon	Wardha
			27	Kamathwada	Wardha
			28	Kamthi	Wardha
			29	Karanji	Wardha
			30	Karanji	Wardha
			31	Karla	Wardha
			32	Kelapur	Wardha

Nagpur			Bhandara		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Borgaon	Kamptee	1	Dighori	Bhandara
2	Chicholi	Kamptee	2	Dongargaon	Bhandara
3	Chikhali	Kamptee	3	Dudhara	Bhandara
4	Chikna	Kamptee	4	Ganglewada	Bhandara
5	Dhargaon	Kamptee	5	Garada Bk.	Bhandara
6	Dighori bk.	Kamptee	6	Garada Jangli	Bhandara
7	Gada	Kamptee	7	Garada Kh.	Bhandara

Nagpur			Bhandara		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
8	Garla	Kamptee	8	Girola	Bhandara
9	Ghorpad	Kamptee	9	Golewadi	Bhandara
10	Gumthala	Kamptee	10	Gopiwada	Bhandara
11	Gumthi	Kamptee	11	Gunjepar	Bhandara
12	Jakhegaon	Kamptee	12	Gunthara	Bhandara
13	Kadoli.	Kamptee	13	Hattidohi	Bhandara
14	Kapsi bk	Kamptee	14	Indurkha	Bhandara
15	Kawtha	Kamptee	15	Injewada	Bhandara
16	Kem	Kamptee	16	Itgaon	Bhandara
17	Kesori	Kamptee	17	Jakh	Bhandara
18	Khairy	Kamptee	18	Jakh	Bhandara
19	Khapa	Kamptee	19	Jamgaon	Bhandara
20	Khaparkheda	Kamptee	20	Jamni	Bhandara
21	Khasala	Kamptee	21	Kanhadmoh	Bhandara
22	Khedi	Kamptee	22	Karachkheda	Bhandara
23	Kusumbi	Kamptee	23	Kardha	Bhandara
24	Lihigaon	Kamptee	24	Kawadshi	Bhandara
25	Lonkhairi	Kamptee	25	Kawalewada	Bhandara
26	Mahalgaon	Kamptee	26	Kesalwada	Bhandara
27	Mangali	Kamptee	27	Khairi	Bhandara
28	Mhasala	Kamptee	28	Khairi	Bhandara
29	Nanda	Kamptee	29	Khamari	Bhandara
30	Nanha	Kamptee			

Chandrapur			Gadchiroli		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
1	Haldi	Chandrapur	1	Ramangatta	Chamorshi
2	Hingnala	Chandrapur	2	Ramkrishnapur	Chamorshi
3	Jambharala	Chandrapur	3	Rammohanpur	Chamorshi
4	Junona Rayyatwari	Chandrapur	4	Rampur	Chamorshi
5	Karwa	Chandrapur	5	Rampur	Chamorshi
6	Khutala	Chandrapur	6	Ramsagar	Chamorshi
7	Kitali	Chandrapur	7	Rashmipur	Chamorshi
8	Kolasa	Chandrapur	8	Ravanpalli	Chamorshi
9	Kosara	Chandrapur	9	Ravindrapur	Chamorshi
10	Lakhamapur	Chandrapur	10	Regadi	Chamorshi
11	Lohara	Chandrapur	11	Rekhegaon	Chamorshi
12	Mahadwadi	Chandrapur	12	Saganapur	Chamorshi
13	Mahakurla	Chandrapur	13	Saganapur	Chamorshi
14	Mamala Mokasa	Chandrapur	14	Sellur	Chamorshi
15	Marada	Chandrapur	15	Shankarpur	Chamorshi

Chandrapur			Gadchiroli		
Sr.	**Name of the Village**	**Taluka**	**Sr.**	**Name of the Village**	**Taluka**
16	Marar Sawali Chak	Chandrapur	16	Shantinagar	Chamorshi
17	Mhasala Rith	Chandrapur	17	Shrinivaspur	Chamorshi
18	Mhatardevi	Chandrapur	18	Simultala	Chamorshi
19	Moharli	Chandrapur	19	Singampalli	Chamorshi
20	Morwa	Chandrapur	20	Somanpalli	Chamorshi
21	Nagala	Chandrapur	21	Somanpur	Chamorshi
22	Nagala	Chandrapur	22	Sonapur	Chamorshi
23	Nagpur	Chandrapur	23	Subhashgram	Chamorshi
24	Nandgur	Chandrapur	24	Syamanagar	Chamorshi
25	Neri	Chandrapur			
26	Nimbala	Chandrapur			
27	Padamapur	Chandrapur			
28	Pahami	Chandrapur			
29	Pandhar Kawada	Chandrapur			
30	Payali Bhatali	Chandrapur			
31	Peth	Chandrapur			
32	Pimpal Khunt	Chandrapur			

Gondia		
Sr.	**Name of the Village**	**Taluka**
1	Ekodi	Gondiya
2	Fattepur	Gondiya
3	Fulchur Tola	Gondiya
4	Gangazari	Gondiya
5	Garra Bk.	Gondiya
6	Garra Kh.	Gondiya
7	Ghiwari	Gondiya
8	Girola	Gondiya
9	Gondi Tola	Gondiya
10	Gondi Tola	Gondiya
11	Gudama	Gondiya
12	Halbi Tola	Gondiya
13	Halbi Tola	Gondiya
14	Hiwara	Gondiya
15	Irri	Gondiya
16	Jabbar Tola	Gondiya
17	Jagantola	Gondiya
18	Jartal	Gondiya
19	Jirutola	Gondiya
20	Junewani	Gondiya
21	Kalar Tola	Gondiya

Gondia		
Sr.	**Name of the Village**	**Taluka**
22	Kamtha	Gondiya
23	Kanhartola	Gondiya
24	Kanhartola	Gondiya
25	Karanja	Gondiya
26	Karutola	Gondiya
27	Kasa	Gondiya

1.8 Title and Reference of Methodology

Consolidated baseline methodology for "Energy efficiency measures in thermal applications of non-renewable biomass"; AMS II-G, Version 03.0.0 Sectoral Scope: 03, EB 60.

1.9 Participation under other GHG Programs

Project has been registered with UNFCCC under Clean Development Mechanism program, Registration reference number is 8809.

The Project is not rejected by any other GHG programs.

1.10 Other Forms of Credit

India is non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity. The project is registered under CDM with registration ID 8809. Project Proponent has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. Project Proponent would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions. Project Proponent has also submitted an undertaking stating that they will not take REC benefits for the same Emission Reductions. Project Proponent has submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration. Project Participant is not taking REC benefits for the same emission reductions.

1.11 Sustainable Development

The project contribution towards sustainable development is established in line with the sustainable development indicator framed by the host country DNA:

Social benefits:

1. Reduces drudgery of women and children of rural areas (due to reduced fuel wood use) by reducing time spent and distance travelled for fuel wood collection. Reduction in firewood requirement helps in spending more time in productive activities such as education, employment etc.
2. Improves overall health (particularly diseases related to respiratory system) of women and children by reducing smoke in the kitchen.

Environmental benefits:

1. Improves the local environment by reducing rate of forest degradation /deforestation in the project area. Conservation of forest is not only reduce non-renewable biomass demand and also reduce soil erosion and loss of biodiversity as a consequence of deforestation.
2. Reduces emission of black carbon to the atmosphere.
3. Reduces Green-house gas emissions.

Economic benefits:

1. Employment opportunities for local communities involved in monitoring, training of users, undertaking periodic maintenance and post life time replacement.
2. Reduces the expenditure involved in the pre project scenario for purchase of fuel wood.

Technological benefits:

1. Introduction of new technology to the rural communities.
2. Knowledge transfer to trainers including technicians for pertaining training to users, maintenance of system.
3. Demonstration of a successful project at household level creates replication potential in other states and countries.

In view of the above, the project proponent considers that, the project activity profoundly contributes towards sustainable development of the region as well as of the nation.

2 SAFEGUARDS

2.1 No Net Harm

According to the Ministry of Environment and Forests (MoEF), Government of India, under the Environment Impact Assessment Notification vide S .O.1533(E), dated 14-September-2006; the project activity of utilization of Improved Cook stove for cooking in rural households does not require environmental impact assessment study to be carried out.

2.2 Local Stakeholder Consultation

The project proponent has opted to develop CDM project for distribution of cook stoves in and across the different location in the state across different time frame. Based on the number of cook stoves aimed to be distributed under the planned program 30 phases are planned. Since the household to be covered in each phase are homogeneous owing to the household being identified by the Rural Development Department, Government of Maharashtra based on the level of poverty judged on the basis of the thirteen point criteria figured out by the Ministry and the total budgetary provision across the year. Because of the limited budgetary provision across a financial year a fixed number of populations can only be covered amongst the group

leaving the others to be covered in subsequent time frame. Because of the similar category of population, the project proponent decided to carry out the stake holder's consultation for all the planned phases in a single go, so that the people from different geographical locations could able to respond to such meeting. The location for the consultation program is so selected that the particular location of the consultation represents the particular division or region of Maharashtra under whose jurisdiction several districts come into. As such the locations for the consultation program are selected and newspaper advertisements are published both in English and regional daily about the program so that the peoples from the particular region can attend the consultation program which they feel nearby. Local stakeholders' meetings were conducted to take public comments. Six stakeholder meetings were conducted at Nasik, Pune, Nagpur, Latur, Sangli and Washim districts of Maharashtra. The details of meetings are –

Date of Meeting	District	Meeting Venue
2nd February 2012	Nasik	Siaram Indrayani Housing Society, Takli Rd, Nasik– 06
2nd February 2012	Pune	G K Energy Marketers Pvt Ltd. Lokmanya Nagar, LBS Rd, Pune
2nd February 2012	Nagpur	246 KumbarPura, Jagnath Rd Gandhi Bag, Nagpur
2nd February 2012	Latur	Sut Mil Rd, Pushkar Residency, Latur
3rd February 2012	Sangli	Khan Bag, Jai Bhavani Chowk, Sangli
3rd February 2012	Washim	Dr. Jirvankar Bhar Jahangir Resod, Washim

Along with public notices published in newspapers namely The Free Press Journal, Mumbai and Navshakti, Mumbai on 26th January 2012, notification of the meetings was sent through invitations, letters and personally to various categories of stakeholders to attend the stakeholder meeting. The meeting was conducted in regional language –Marathi and English. The discussion points of the meeting included purpose of the consultation, background and role of bundling agency and manufacturer under this project, description of the project, demonstration of improved cook stove, about climate change and CDM, impact of climate change, global environment scenario, contribution of the project towards sustainable development of the country by the representative from bundling agency and Improved Cook stove manufacturer. After a detailed elaborative discussion on the project, the stakeholders were asked to provide their comments /feedbacks /suggestions on the project.

The cook stoves in this project activity (fourteenth Phase) are distributed in Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts of Maharashtra which lies in the Aurangabad, Amravati and Nagpur division jurisdiction. The stakeholders consultation conducted on 2ndand 3rdFebruary 2012 at Nagpur, Latur and Washim district in Aurangabad, Amravati and Nagpur covered this project location and the consultation was also conducted before webhosting of the PDD. The meetings were attended by members from various backgrounds as listed below –

Participant of Nagpur meeting –

Sl. No.	Name of Person	Designation
1	Gopal R Kabra	CEO, GKEMPL

2	Raju Babasaheb Kadam	Farmer
3	Sopan Sham Kale	Student
4	Jitesh Gawale	Working professional
5	Kartik Kumar	Student
6	Imran Munjaver	Businessman
7	Makrand Mane	Working professional
8	Rahul Awtade	Businessman
9	Raju Namdev Pagar	Working professional
10	Sanjay Shinde	Businessman

Participant of Latur meeting –

Sl. No.	**Name of Person**	**Designation**
1	Vikram Kale	Sr. Operator
2	Namdev Kale	Student
3	Ramesh Padval	Farmer
4	Apparao Gonje	Working professional
5	Dinesh Kamble	Farmer
6	Goremama	Working professional
7	Pritesh Choudhury	Working professional
8	Vayjanath Navgire	Working professional
9	Papu Jagdale	Working professional
10	Somnath Lohar	Working professional
11	Shivaji Karad	Working professional
12	Somanath Chandane	Farmer
13	Kondeba Manere	Working professional
14	Rajkumar Shinde Working	Working professional
15	Vishal Pandit	Farmer

Participant of Washim meeting –

Sl. No.	**Name of Person**	**Designation**
1	Chandrakant Jaising Bhadre	Farmer
2	Jaganath Kadam	Working professional
3	Anand Bhanudass Pawar	Working professional
4	Appa Navgire	Working professional
5	Gautam Suryavanshi	Working professional
6	Rangarao Suryavanshi	Farmer
7	Dhanjay Suryavanshi	Farmer
8	Bhaskar Bhadre	Farmer
9	Satish Jagtap	Student
10	Ganesh Bhosale	Working professional
11	Sachin Jagdale	Working professional
12	Ashok Ghorpade	Working professional
13	Dhanjay Sanjekar	Working professional
14	Padmakar Meshram	Farmer

15	Vijay Navalkar	Farmer
16	Amol Barkue	Farmer
17	Prakash Subash Jhande	Working professional
18	Shaji Rathod	Working professional
19	Madhular Rathod	Local representative
20	Milind Bondge	Local representative
21	Mustaffa Mukadam Shekh	Local representative
22	Prithviraj Suryavanshi	Marketing Executive, Vikram Stoves

The overall response from the local stakeholders on the project was encouraging and positive. No adverse or negative comments or response received in the meeting. The participants of the meeting had not raised any significant concerns nor seek any clarification related to potential impacts of the project activity or any other issue. The project as a whole gives positive impression towards the issue of sustainable development of the country.
The stakeholder's comments sought during the meeting in following manners –

- The stakeholders were invited to ask any clarification or information on the project activity during the meeting.
- Evaluation form / questionnaire were asked to fill in by the stakeholders interested to give their inputs on the project activity.

The evaluation forms were analyzed for the comments and no negative comments is being found.

The summary of stakeholders comment received during stakeholders meeting of Nagpur, Latur and Washim are summarised as below –

Queries	**Reply**
· The benefits that, users of Improved Cook stove will receive from the project activity? · Whether the users have to file an application to any office to consider their system under the project activity?	Mr. Kabra of GKEMPL explained that, use of improved cook stoves for household cooking will reduce indoor air pollution, cooking time and also fuel-wood consumption due to higher efficiency. Moreover, the users of improved cook stoves will get free maintenance service and free of cost replacement of the system at the end of its lifetime with new improved cook stove. In reply to the next query, he clarified that, users need not to apply to anywhere to be considered under the project. The representative of GKEMPL will contact to every users for necessary due diligence
Time required for the CDM project development.	Responding to the query Mr. Kabra replied that, time line for CDM project development and registration is around one year but, the revenue inflow will take at least another one year.
Quantum of CER to be generated from each Improved Cook stove system?	Addressing to the query Mr. Kabra, GKEMPL replied that, approximately about 1.10 CER will be generated in every year by use of each Improved Cook stove

Queries	**Reply**
Tasks to be undertaken by the users of Improved Cook stove for	Addressing to the query Mr. Kale representative of Vikram stoves described the monitoring plan, the parameters to be monitored and steps to undertake by the user. Further, he continue with

successful receipt of CDM revenue and benefit to be received by them in return.	clarification that, Improved cook stove users will get free maintenance service and free of cost replacement of the Improved Cook stove system will be given at the end of lifetime during the crediting period.
How long can the user obtain the CDM benefit	Responding to the query Mr. Vikram Kale representative of Vikram stoves mentioned that, improved cook stove systems considered under the project will receive free of cost maintenance service for 10 years from date of registration.

Queries	**Reply**
Whether there is any possibility of negative impact to the health of the user or to the local environment?	The representative from Vikram Stoves explained that, there will be no detrimental effect on user's health due to the project activity as it is contributing in pollution reduction. Rather, the project is reducing fire-wood consumption through improved combustion technology and thereby reducing deforestation and green-house gases emission. Apart from this, the project is reducing indoor air pollution by means of smoke reduction.
The benefits that users of Improved Cook stove will receive from the project activity?	Mr. Suryavanshi representative from Vikram Stoves replied that, use of improved cook stoves for household cooking will reduce the indoor air pollution, cooking time and also fuel-wood consumption due to higher efficiency. Moreover, the users of improved cook stoves will get free maintenance service and free of cost replacement of the system at the end of its lifetime.
Clarification whether the plants to be installed in future will get this benefit?	Addressing to the query Mr. Suryavanshi, representative from Vikram Stoves replied that, all the improved cook stoves distributed after a particular date will be considered for carbon credit benefit under these projects. But, the no. of systems to be considered under the projects depends upon the threshold limit as given by the UNFCCC. Therefore, may be all stoves cannot be considered.
How long the user will get this benefit?	Responding to the query Mr. Suryavanshi representative from Vikram Stoves replied that, ICS systems considered under the project will receive free of cost maintenance service for 10 years post registration.

Local stakeholder consultation has been conducted at the time of project registration. For on-going stakeholder's communication, PP have made the provision of the grievance register. The local stakeholders/beneficiaries can anytime lodge their grievances if any in the register over the operational life time of the project. The PP is responsible to address any grievances received.

No grievance received during the current monitoring period.

2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The improved cook stove conceived under the project activity is MNRE and BIS (Bureau of Indian Standard) approved state of art and environmentally sound technology. The improved cook stove is manufactured in accordance to IS13152 (Part 1): 1991 (Solid Biomass – Chulha Part 1(Metallic))[13]. The standard has been prepared in line with the national approach towards fuel conservation, better environment, mitigating health hazards and loss of forest cover caused by burning of wood as cooking fuel and therefore, can be conceived as an environmentally sound technology for combustion of solid biomass for the purpose of cooking. Moreover, the materials used in manufacturing of the cook stove are of iron and steel which is recyclable after end use and hence, considered to be environmentally safe after lifetime also. Although the ICS distributed under the current phase pertains to different batch of manufacturing, but since the products are being manufactured complying to a particular performance standard (IS13152 (Part 1):1991) the quality output for each unit of products complies to a minimum level.

The cook stove distributed under the project activity is a portable, single-pot stove without chimney, natural draft and metal made stove specifically suitable for combustion of solid biomass. The cook stove broadly comprises of a combustion chamber, top plate for holding the utensils, grate for holding fuel during combustion and bottom plate that facilitates ventilation of air. The combustion chamber is cylindrical shaped and made up of mild steel. One side of the chamber of improved cook stove is opened for feeding of fuel. The chamber top plate is die cast and made up of cast iron.

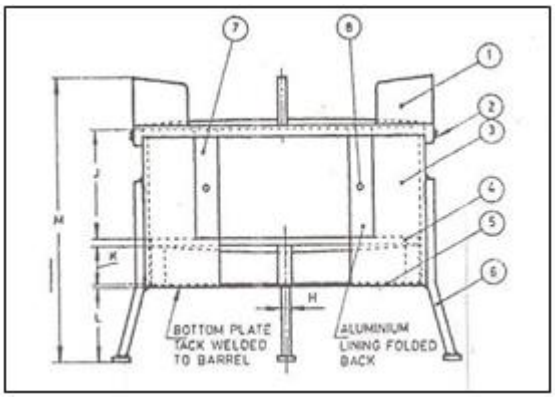
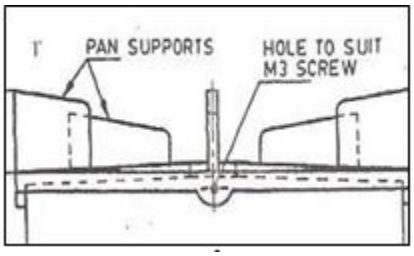


Diagram of Improved Cook Stove

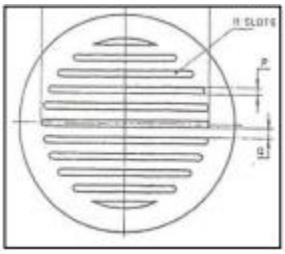
1. Top plate,
2. Screw,

[13] The Standard has been prepared by Indian Standard body in line with the national approach towards fuel conservation and better environment, mitigating Health hazards and drudgery and loss of forest cover caused by burning of wood as cooking fuel (Forward: Indian Standard Solid Bio-Mass, Chulha – Specification Part 1 Portable (Metallic))

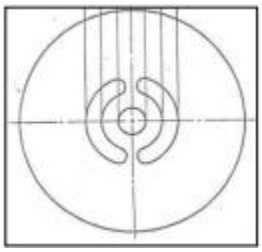
3. Barrel,
4. Grate,
5. Bottom Plate,
6. Legs,
7. Aluminium Lining and
8. Rivet



Top Plate



Grate



Bottom Plate

Material used for manufacturing of each component of the cook stoves are:

Component	**Material**
Top plate	Cast iron
Grate	Cast iron
Barrel	Mild steel
Bottom Plate	Mild steel
Lining	Aluminum
Perforated Sleeve	Mild steel
Handle	Mild steel
Pan Support	Mild steel sheet-flat-rod
Legs	Mild steel sheet and rod

Life time

The operational lifetime of the cook stove is 5 years 00 months. As per manufacturer authorization the operational life of improved cookstoves is over seven years, however beyond five years the operational efficiency drops below the rated efficiency and hence was considered as operational life time in the registered PDD.

Decline in the cook stove efficiency as assessed through periodic efficiency testing is being reported and considered as part of emission reduction calculation.

Replacement of Improved Cookstoves

Replacement of ICS was scheduled to be carried out

(a) in case of breakage/ dismantle of ICS during the operational period – on receipt of complaint the localised service providers of the project proponent visits the beneficiary with backup cook stoves (ICS) and provides the beneficiary with backup stoves if the service provider fails to address the issues locally. The malfunctioned ICS post collected from beneficiary is thereafter sent to the company workshop in case of possibility of repair. In case the ICS couldn't be repaired beneficiary are to be provided with new ICS.

(b) Observed requirement of complex repair- In case the maintenance team of the project proponent during scheduled O&M observes requirement of complex repairs the team may on discretion replace the existing cookstoves with a new one or a backup one. In such case the beneficiary is provided with backup new ICS the same are to be replaced with the repaired one operating at the desired satisfaction level of beneficiary.

(c) Post assessment of operational efficiency in the last year after the elapse of scheduled lifetime of ICS from the date of distribution.

During the current monitoring period of 5 years there has been no instances of replacement of improved cook stoves, therefore no such impact on emission reduction calculation due to increase of cook stoves efficiency.

Operation and maintenance

Operation and maintenance of Improved cook stoves are carried out periodically by authorised representative of project proponent (manufacturer of improved cook stoves). The authorized representative of the project proponent during the annual (periodic) maintenance, also motivates and persuades the beneficiaries for continuation of ICS usages for cooking of all meals towards reducing the health impact of the family especially the women and children in case of usage of traditional cook stoves and thereby ensuring the restoration of operation of ICS.

Approach for assessing share of Improved cookstoves users for estimation of emission reduction

1. The number of beneficiaries using Improved cook stoves during a particular monitoring period are assessed based on record of operation and maintenance, maintained by project proponent pertaining to discontinued users.
2. Annual third-party sample survey is being carried out to assess the share of beneficiaries using improved cookstoves. During survey in case beneficiaries were evaluated to be

using improved cook stoves for a limited period along with usage of traditional cookstoves the beneficiaries are considered as partial users. Partial users are beneficiaries /household, those who have not discontinued using of ICS but have been using ICS for a limited period and also using traditional cookstoves for the purpose of cooking along with ICS. Since the number of days of operation of partial ICS usage during a particular crediting period is hard to ascertain (uncertainty of estimation), therefore as a conservative approach the beneficiaries /household using ICS partially are considered as discontinued users.

The survey observed/found most of the beneficiaries to have fully discontinued the usage of traditional cookstoves and have even dismantled the traditional cookstoves.

Around 5-10% of beneficiaries during a particular crediting period have been assessed to have partially used traditional cookstoves (as deduced from the beneficiary survey) due to customary practice/festival or to manage guests. Considering the perceptive response of the beneficiaries regarding the number of day of functioning of traditional cookstoves, it is conservatively considered that the number of days of use of improved cookstoves for those particular beneficiaries who have used traditional cookstoves as zero/nil. Although such consideration negatively impacts the annualized emission reductions estimate but such consideration is being conservatively considered for the purpose of calculation.

3.2 Deviations

3.2.1 Methodology Deviations

Not Applicable

3.2.2 Project Description Deviations

Not Applicable

3.3 Grouped Projects

Not Applicable

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	B_{old}
Data unit	tonnes/ household/year
Description	Quantity of woody biomass used in absence of the project activity
Source of data	Teri Energy Data Directory Yearbook for 2010

Value applied	1.469
Justification of choice of data or description of measurement methods and procedures applied	The study as per Wood Fuel Trade in India – Food and Agricultural Organisation of the United Nation, July 2001, per capita per day biomass consumption of 1.52 kg and 5.6 kg of fuel wood consumption per household per day. Annual consumption per household per day is therefore estimated at 2.044 tonnes. **Further, the publication of TERI Energy Data Directory and Yearbook2010** outlines that, the per capita per month consumption of fire wood in Maharashtra at 25.51 kg/ month/capita. With average population size of 4.8 persons/household/the annual consumption of firewood is estimated at 1.469 tonnes/year/household. Being the annual household fuel consumption data estimated on the basis of the TERI Energy Data Directory is most conservative amongst the available fuel wood consumption figure available secondarily the value of 1.469 tonnes/household/year is considered for estimation of By, savings.
Purpose of Data	Quantity of biomass utilization is used to estimate the quantum of biomass that will be saved in the project scenario after factoring into the improvement of efficiency.
Comments	The maximum value of Bold is fixed at ex-ante. Factors calculated based on the number of days of traditional cook stove usage and number of days of improved cook stoves usage is multiplied with Bold to estimate the Bold to be used for emission reduction calculation.

Data / Parameter	η_{new}
Data unit	%
Description	Efficiency of the cook stove being deployed as a part of the project activity
Source of data	Test report issued by Biomass Cook stove Testing Centre, Dept. of Renewable Energy Sources, Udaipur
Value applied	29.88%
Justification of choice of data or description of measurement methods and procedures applied	Thermal efficiency test carried out as per water Boiling Test Protocol specified as per IS13152 protocol.

Purpose of Data	Efficiency of the improved cookstoves is used to estimate the saving in fuel wood. (The factor is not fixed ex-post and estimated based on monitored efficiency of sample number of cookstoves)
Comments	The value of Efficiency is monitored on an annual basis and vintage wise.

Data / Parameter	$B_{y,savings}$
Data unit	tonne/household/year
Description	Quantity of woody biomass saved due to implementation of the project activity
Source of data	Calculated
Value applied	0.9774
Justification of choice of data or description of measurement methods and procedures applied	$B_{y,\ savings\ is}$ calculated using equation $B_{y,\ savings} = B_{old} * (1- \eta_{old}/ \eta_{new})$ =1.469*(1-0.1/0.2988) =0.9774 tonne /household/year
Purpose of Data	Fuel wood saving is calculated for estimation of emission reduction.
Comments	The efficiency of the improved cook stoves is monitored on an annual basis based on the sample survey and if appliances are found to be operational with lower efficiency then, the actual efficiency determined during monitoring is considered to calculate emission reduction.

Data / Parameter	**Energy Saving per cook stove or household**
Data unit	GWh_{th}/household/year
Description	Energy saving per cook stove due to improved efficiency of the distributed cook stove
Source of data	Calculated
Value applied	0.00407
Justification of choice of data or description of measurement methods and procedures applied	Energy Saving = $B_{y,\ saving} * NCV_{biomass}$ = Bold * $(1- \eta_{old}/\eta_{new})* NCV_{biomass}$ = 1.469 * (1- 0.1/0.2988) * 0.0150 = 0.01466 TJ /household /year = 0.00407 GWhth/household/year = 4.073 MWhth/ household/year

	= 1.358 MWhe / household/year Note: Value of $NCV_{biomass}$ is considered as per Paragraph 5 of the applicable methodology AMS -II. G. Version 03; IPCC default value for fuel wood i.e. 0.015 TJ/tonne is chosen.
Purpose of Data	The data is used to assess the applicability condition of the project under micro small scale guidelines and also de-bundling.
Comments	-

Data / Parameter	$F_{NRB,y}$
Data unit	-
Description	The factors relates to the fraction of non-renewable biomass
Source of data	Calculated using secondary sources
Value applied	87.9%
Justification of choice of data or description of measurement methods and procedures applied	The fraction of non-renewable biomass is calculated based on the fuel wood demand and supply of biomass across the state of Maharashtra.
Purpose of Data	Data is used for estimation of emission reduction.
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	η_{new}
Data unit	%
Description	Efficiency of the system being deployed in project activity
Source of data	Third party efficiency test report.
Description of measurement methods and procedures to be applied	The sample systems tested as per Water Boiling Test Protocol indicated in IS 13152 (Part 1): 1991 for solid biomass cook stove. The testing is carried out on annual basis of representative sample. The minimum value of tested efficiency or 29.88% which so ever is lower is used to calculate emission reduction of the systems for particular year of operation.
Frequency of monitoring/recording	Efficiency of the improved cookstoves under operation is monitored across sample system on an annual basis
Value monitored	Period | Date of Monitoring | Number of Improved cookstoves assessed | Minimum efficiency of the lot

4 Oct 12 - 3 Oct 13	24-11-2013 26-11-2013 05-12-2013 01-12-2013 08-01-2014 10-01-2014 12-01-2014 12-01-2014 14-01-2014 14-01-2014 10-01-2014 08-01-2014 06-12-2013 04-12-2013 02-12-2013 30-11-2013 28-11-2013 26-11-2013 24-11-2013	40	28.56%
4 Oct 13 - 3 Oct 14	08-01-2015 26-11-2014 05-12-2014 01-12-2014 24-11-2014 10-01-2015 12-01-2015 12-01-2015 14-01-2015 14-01-2015 10-01-2015 08-01-2015 24-11-2014 26-11-2014 28-11-2014 30-11-2014 02-12-2014 04-12-2014 06-12-2014	40	27.81%
4 Oct 14 - 3 Oct 15	12-01-2016 01-12-2015 08-01-2016 12-01-2016 10-01-2016 05-12-2015 24-11-2015 26-11-2015 10-01-2016 14-01-2016 08-01-2016 14-01-2016 06-12-2015 02-12-2015 30-11-2015 04-12-2015 28-11-2015 26-11-2015 24-11-2015	40	27.11%
4 Oct 15 - 3 Oct 16	05-12-2016 08-01-2017 24-11-2016 26-11-2016 01-12-2017 12-01-2017 10-01-2017 12-01-2017 06-12-2016 08-01-2017 04-12-2016 02-12-2016 14-01-2017	40	26.20%

		14-01-2017 10-01-2017 26-11-2016 24-11-2016 30-11-2016 28-11-2016		
	4 Oct 16 - 3 Oct 17	24-11-2017 10-01-2018 12-01-2018 02-12-2017 30-11-2017 28-11-2017 26-11-2017 24-11-2017 06-12-2017 04-12-2017 12-01-2018 26-11-2017 05-12-2017 01-12-2017 08-01-2018 14-01-2018 14-01-2018 10-01-2018 08-01-2018	40	26.07%

Monitoring equipment	1. Digital Thermometer 2. Weighing scale
QA/QC procedures to be applied	Efficiency of the system is tested by third party agency on principle of the Water Boiling Test Protocol indicated in IS 13152 (Part 1): 1991. The number of sample system to be inspected is estimated in accordance to "**Guidelines for Sampling and Surveys for Project Activities and Programme of Activities"** Version 02, EB 69 Annex 5 and procedure for sample size calculation is specified in Section B.7.2 of the CDM PDD.
Purpose of the data	The value of the efficiency is used to calculate the $B_{y,\ savings}$ used for ex-post estimation of emission reduction.
Calculation method	**Heat utilized** = (n-1)×(W×0.214+w) ×(t2-t1) + (W×0.214+w) ×(t3-t1) kcal **Heat Produced** = [(X×c1)+(x×d/1000×c2)] kcal **Thermal Efficiency** = Heat utilised/ Heat Produced×100 **Where**

w	Mass of water in vessel, in kg
W	Mass of the vessel complete with lead and stirrer, in kg
X	Mass of the fuel consumed, in kg
c_1	Calorific value of wood in kcal/kg
x	Volume of the kerosene consumed, in ml
c_2	Calorific value of kerosene in kcal/kg
d	Density of kerosene, in g/ml
t_1	Initial temperature of the water, in ^{0}C
t_2	Final temperature of the water, in ^{0}C

	t_3	Final temperature of the water in the last vessel at the completion of the test, in ^{0}C
	n	Total number of vessels used
	0.214	Specific heat of aluminium in kcal/kg^{0}C
Comments	As a part of the third party sample assessment of the operational efficiency of improved cookstoves, the minimum of the assessed efficiency from amongst the fourty system tested below 29.88% is considered as a efficiency to be considered for purpose of emission reduction calculation in place of 29.88% (rated efficiency). Although the ICS distributed under the current phase pertains to different batch of manufacturing, but since the products are being manufactured complying to a particular performance standard (IS13152 (Part 1):1991) the quality output for each unit of products complies to a minimum level. Moreover, the distribution is carried out during same period amongst homogeneous beneficiary segment, moreover the onset of operations of ICS has been kept at the same point of time. Therefore, as per the guidelines specified under the registered PDD Simple Random sampling methods were selected. The data estimated is archived both in paper and electronic spread sheet whereby the paper and the electronic form of the documents is maintained by the Project Participant for period of two year and electronic data is maintained till 2 years after the last issuance.	

Data / Parameter	**No. cook stoves in use**
Data unit	Number
Description	The number of improved cook stoves distributed to households under the project activity and under operation.
Source of data	Third party agency survey report and database managed by the Project Participant (the end user agreement)
Description of measurement methods and procedures to be applied	The monitoring consists of third-party survey of representative sample on annual basis to evaluate the number of systems in operation. The percentage of cook stove in usage as estimated from the survey result is multiplied with the total number of cook stove to determine number of cook stove in operation and to be considered for the purpose of emission reduction calculation.
Frequency of monitoring/recording	Number of improved cookstoves under operation is monitored annually based on sample survey
Value monitored	During survey in case beneficiaries were evaluated to be using improved cook stoves for a limited period along with usage of

traditional cookstoves the beneficiaries are considered as partial users. Partial users are beneficiaries /household, those who have not discontinued using of ICS but have been using ICS for a limited period and also using traditional cookstoves for the purpose of cooking along with ICS. Since the number of days of operation of partial ICS usage during a particular crediting period is hard to ascertain (uncertainty of estimation), therefore as a conservative approach the beneficiaries /household using ICS partially are considered as discontinued users for the purpose of estimating emission reduction.

Period	No. of Dis-continued user	Date of Survey	Number of beneficiaries surveyed	% of partial users	% of users used ICS only
4 Oct 12 - 3 Oct 13	0	24-11-2013 26-11-2013 05-12-2013 01-12-2013 08-01-2014 10-01-2014 12-01-2014 12-01-2014 14-01-2014 14-01-2014 10-01-2014 08-01-2014 06-12-2013 04-12-2013 02-12-2013 30-11-2013 28-11-2013 26-11-2013 24-11-2013	160	3.13%	96.88%
4 Oct 13 - 3 Oct 14	0	08-01-2015 26-11-2014 05-12-2014 01-12-2014 24-11-2014 10-01-2015 12-01-2015 12-01-2015 14-01-2015 14-01-2015 10-01-2015 08-01-2015 24-11-2014 26-11-2014 28-11-2014 30-11-2014 02-12-2014 04-12-2014 06-12-2014	160	5%	95%
4 Oct 14 - 3 Oct 15	0	12-01-2016 01-12-2015 08-01-2016 12-01-2016 10-01-2016 05-12-2015 24-11-2015 26-11-2015 10-01-2016 14-01-2016 08-01-2016 14-01-2016 06-12-2015 02-12-2015	160	6.88%	93.13%

		30-11-2015 04-12-2015 28-11-2015 26-11-2015 24-11-2015			
4 Oct 15 - 3 Oct 16	0	05-12-2016 08-01-2017 24-11-2016 26-11-2016 01-12-2017 12-01-2017 10-01-2017 12-01-2017 06-12-2016 08-01-2017 04-12-2016 02-12-2016 14-01-2017 14-01-2017 10-01-2017 26-11-2016 24-11-2016 30-11-2016 28-11-2016	160	8.13%	91.88%
4 Oct 16 - 3 Oct 17	0	24-11-2017 10-01-2018 12-01-2018 02-12-2017 30-11-2017 28-11-2017 26-11-2017 24-11-2017 06-12-2017 04-12-2017 12-01-2018 26-11-2017 05-12-2017 01-12-2017 08-01-2018 14-01-2018 14-01-2018 10-01-2018 08-01-2018	160	9.38%	90.63%

Number of Improved Cook stoves distributed – 14,517

Monitoring equipment	-
QA/QC procedures to be applied	The project proponent obtains an authorization from each /group of the household in form of end user agreement for processing of carbon revenue. The database containing all information of the end user agreement is maintained in a central server located with project participant and accessible to the project team at different locations. During the time of verification, the VVB can verify the list of beneficiaries who has signed the end user agreement (for which the emission reductions are claimed).
Purpose of the data	For estimation of baseline emission
Calculation method	Share of beneficiaries using Improved cookstoves $= \frac{160 - \text{no of partial users}}{160}$

Comments	The percentage of the representative sample using the improved cook stove determined from the sample survey is used to calculate the total number of cook stoves in operation. The survey report is kept and maintained by the project proponent for the period of two years after the last issuance. Since, the distribution of Improved cook stoves is carried out during same period amongst homogeneous beneficiary segment, and moreover the onset of operations of ICS has been kept at the same point of time. Therefore, as per the guidelines specified under the registered PDD Simple Random sampling methods were selected.

Data / Parameter	**Days of Operation**
Data unit	Number
Description	The parameter relates to the number of days for which the cook stove in operation during the particular year
Source of data	Monitoring Database
Description of measurement methods and procedures to be applied	The emission reduction as against the cook stove is calculated when the system is being delivered to the end user, the end user initiated its operation and the end user agreement is being signed. Since, the emission reduction is based on the days of operation therefore, it is important to monitor the number of days of non-functioning. The days of non-functioning is estimated based on the number of days between the date of complaint as against damage or non- functioning received and date of repair or replacement. The information is maintained in form of database and archived. Number of days of operation = 365–Average number of days the cook stove was non-functional The number of non-functional days is based on the number of days the cook stoves were under repair/replacement
Frequency of monitoring/recording	Days of operation of improved cookstoves under operation is monitored annually based on sample survey
Value monitored	
Monitoring equipment	-

Period	Total number of beneficiaries	Number of beneficiaries for which defunct date was a day/more	Average days of operation
4 Oct 12 - 3 Oct 13	14,517	0	365
4 Oct 13 - 3 Oct 14	14,517	0	365
4 Oct 14 - 3 Oct 15	14,517	0	365
4 Oct 15 - 3 Oct 16	14,517	0	365
4 Oct 16 - 3 Oct 17	14,517	0	365

QA/QC procedures to be applied	The database for the date of dissemination of cook stoves, date of receipt of complaint for repair/ replacement and the date of repair/replacement is recorded by the village coordinator. The related information is maintained by the village co-ordinator and passed on to the VCS team on a monthly basis. In case of the cook stove being replaced, a new end user agreement is signed with the end user and attached to the original agreement. Monitoring database and the end user agreement is maintained both in soft as well as hard copy.
Purpose of the data	For estimation of baseline emission
Calculation method	-
Comments	The number of days for which the improved cook stoves were non-functional is considered for estimation of emission reduction. The record of database and copy of end user agreement is kept and maintained by the project participant for the period of two years after the last issuance. For ex-post, the total number of days of non-operation of the improved cook stoves due to repair, maintenance is retrieved from the maintenance log books is averaged as against the total number of cook stoves in actual operation (as per survey) and is considered. Say, if n is the total no of non- operational days as per the maintenance records of all of the cook stoves, the average days of non-operation for each cook stove is estimated as = n/x where x is the number of cook stoves in actual operation as per the sample survey.

Data / Parameter	**Number of days of functioning of traditional cook stoves**
Data unit	Number
Description	The parameters refer to the number of days for which the traditional cook stove is being used by the household.
Source of data	Annual third-party agency survey of representative sample household
Description of measurement methods and procedures to be applied	Survey is carried out to estimate the number of days for which the household has operated the traditional cook stove during a particular monitoring period.
Frequency of monitoring/recording	Number of days of functioning of traditional cook stoves is monitored annually based on sample survey
Value monitored	0 During survey in case beneficiaries were evaluated to be using improved cook stoves for a limited period along with usage of traditional cookstoves the beneficiaries are considered as partial users. Partial users are beneficiaries /household, those

	who have not discontinued using of ICS but have been using ICS for a limited period and also using traditional cookstoves for the purpose of cooking along with ICS. Since the number of days of operation of partial ICS usage during a particular crediting period is hard to ascertain (uncertainty of estimation), therefore as a conservative approach the beneficiaries /household using ICS partially are considered as discontinued users. Since the beneficiary using traditional cookstoves were opted out of emission reduction estimation therefore the beneficiaries considered resembles only to those who are using improved cookstoves. Therefore the days of usage of traditional cookstoves for beneficiaries considered is zero.
Monitoring equipment	-
QA/QC procedures to be applied	The survey is carried out by third party agency and is co-ordinated by the project proponent.
Purpose of the data	For estimation of baseline emission
Calculation method	-
Comments	Number of days of operation of the traditional cook stove is obtained from the result of sample survey. The number of days of traditional cook stove as per the survey is used to obtain the average days of usage of the traditional cook stoves for all the households who still use the improved cook stoves of this project activity. This average day is used to arrive at a factor - = (365- Average number of days of traditional cook stove usage in all households /365)

Data / Parameter	**Number of Cook stove replaced**
Data unit	Number
Description	The parameters refer to the number of cook stove that are replaced (due to end-of-life time or damage) by the new cook stove with efficiency greater than or equal to 29.88%.
Source of data	Monitoring database, new end user agreement and test certificate of the new system supplied.
Description of measurement methods and procedures to be applied	Record is being updated in the databases as and when the improved cookstoves are replaced by a new one . On replacement a new end user agreement is signed with the existing end user and the information relating to the replacement along with necessary details is updated in the database.
Frequency of monitoring/recording	Recorded as and when replaced
Value monitored	

Period	Number of improved cookstoves	Number of cookstoves replaced post end of life time	Number of cookstoves replaced

		distributed and under operation		due to defunct
	4 Oct 12 - 3 Oct 13	14,517	0	0
	4 Oct 13 - 3 Oct 14	14,517	0	0
	4 Oct 14 - 3 Oct 15	14,517	0	0
	4 Oct 15 - 3 Oct 16	14,517	0	0
	4 Oct 16 - 3 Oct 17	14,517	0	0
Monitoring equipment	-			
QA/QC procedures to be applied	The copy of the new end user agreement for the replaced cook stove along with the efficiency certificate of the new system is archived along with the existing agreement. The database is updated as and when the system is replaced.			
Purpose of the data	Assessment of baseline emission			
Calculation method	-			
Comments	The record of database and copy of end user agreements (both new and old one) is maintained by the project participant for the period of two years after the last issuance.			

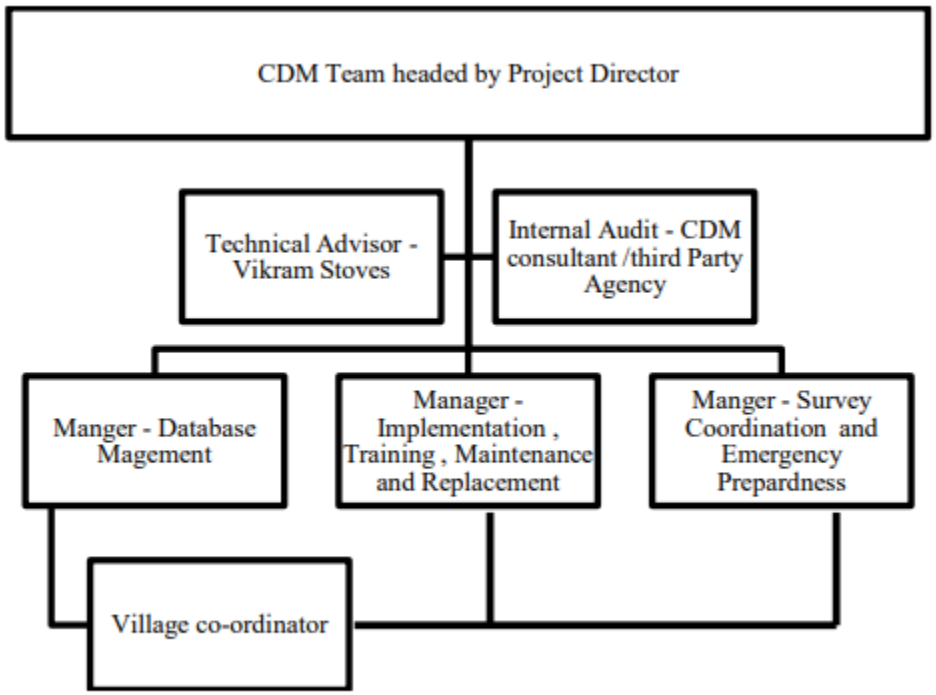
Data / Parameter	$B_{y,\ savings}$
Data unit	Tonnes/year/household
Description	Quantity of woody biomass that is saved through the project activity.
Source of data	calculated
Description of measurement methods and procedures to be applied	The quantity of woody biomass saved is calculated following the equation $B_{y,\ saving} = B_{old} * (1- \eta_{old}/\eta_{new})$ Where, B_{old} is calculated based on number of days cook stove is operational as calculated above and per capita biomass consumption of 25.51 kg/person/month multiplied by 4.8 members per rural household also factoring into the number of days for which the traditional cook stoves were in operation and the number of days of non-functioning of the improved cook stoves. The efficiency of the project system is tested on a representative sample basis.
Frequency of monitoring/recording	Calculated on an annual basis
Value monitored	

Period	Operational Efficiency considered	Estimated By savings/ ICS
4 Oct 12 - 3 Oct 13	28.56%	0.9547
4 Oct 13 - 3 Oct 14	27.81%	0.9408
4 Oct 14 - 3 Oct 15	27.11%	0.9271
4 Oct 15 - 3 Oct 16	26.20%	0.9082

	4 Oct 16 - 3 Oct 17	26.07%	0.9056
Monitoring equipment	-		
QA/QC procedures to be applied	The minimum tested efficiency of the representative samples or 29.88% is used for $\eta_{new.}$		
Purpose of the data	-		
Calculation method	-		
Comments	The data estimated and the survey related documents is archived by the project participant for the period of 2 years after the last issuance.		

4.3 Monitoring Plan

The monitoring of the Project activity is executed by the team of the Project Participant, Village level coordinator appointed by the Project Participant, Technical Advisor from Vikram Stoves and consultant whose specific role and responsibilities are explained as follows. The following section also explicitly indicates the monitoring plan, implementation and record archiving procedure, management of monitoring, facilitating survey, training, maintenance plan and emergency preparedness.
The detailed team structure for executing the monitoring is as follows:



Roles and Responsibilities
The roles and responsibilities of the team include:

- Undertaking awareness amongst the beneficiaries relating to usefulness of the cook stoves.

- Providing training to each entity on the operating methods and regular maintenance practice of improved cook stoves.
- Undertaking maintenance of the cook stoves on a periodic basis.
- Replacing supplied improved cook stoves with new one at the end of technical life time of the distributed system within the crediting period.
- Development and monitoring of project.
- Undertaking spot check, annual survey to access the usage, functional efficiency, maintain database and facilitate monitoring as described in section B.7.as well as the following section of the PDD.

The end users or beneficiaries is responsible for -

- Continual usage of cook stoves
- Undertaking regular maintenance
- Supporting the village coordinator and the project participant in undertaking monitoring
- Inform the village coordinator in case the cook stove malfunctions.
- Dismantle or refrain from use of traditional cook stove
- In case the family decides to shift to the same is intimated to the village coordinator.

The purpose of monitoring is to achieve actual and credible emission reduction estimation pertaining to the project activity. The project participant therefore, needs to monitor and archive data required for estimation of emission reduction.

According to the approved methodology AMS -II. G.; the monitoring comprises of –

1. Efficiency check of the representative sample on annual basis to ensure that, the cook stoves are still operating at the specified efficiency (ηnew). If appliances are found to be operational with efficiency lower than 29.88%, the efficiency determined during monitoring is used to calculate emission reduction. (In accordance to Paragraph 15 of the approved methodology)

- Thermal efficiency test is carried out in accordance to the Water Boiling Test Protocol as specified in IS 13152 (Part 1): 1991 standard.
- The sample size is selected in accordance to "Guidelines for Sampling and Surveys for Project Activities and Programme of Activities" Version 2, EB 69.

2. Monitoring also consists of checking of representative sample on annual basis to determine if the improved cook stoves are still operating or are replaced by an equivalent in service appliance. In case of replacement, it is ensured that, efficiency of new equipment is similar to the equipment being replaced.
   If the cook stove is replaced with higher efficiency appliances, then, the efficiency of 29.88% is considered as conservative approach. (In accordance to Paragraph 16 of the methodology)

3. Monitoring ensures that:

a. Either the replaced low efficiency appliances are disposed of and not used within the boundary or within the region; or

b. If baseline stoves continue to be used, monitoring ensures that the fuel-wood consumption of those stoves is excluded from Bold.

Therefore, the project proponent has developed a plan for monitoring under the following heads –

Implementation Arrangements and Record archiving-

All the household post to the distribution of the cook stoves is oriented to its usage and regular maintenance. With registration of the project under the UNFCCC; the project participant imparts an awareness session over cookstove usage.

As a part of the implementation program the project participant ensures:

1. Signing of the end user agreement with the beneficiaries (the project participant completes signing of end user agreement with all the beneficiaries who are being provided with the cook stoves before registration of the project). As a part of the contractual agreement with each of the beneficiaries for the titled project a unique identification number is issued as against to each project cook stoves. Moreover, as a part of the agreement each of the end user ascertains that they won't be entering into agreement with other agencies to obtain revenue. The above two steps nullify the chances of double counting.
2. The coordinators are employed under the project activity and is responsible for monitoring, archiving of the records and undertaking maintenance.
3. Creating database to archive relevant information about the end user, cook stoves and related information of the end user agreement. The database is created based on the end user agreement and is managed by the team. The database contains all the relevant information about the beneficiary in regard to the end user agreement. Each of the beneficiaries in the database is identified by the unique identification number. The database manager ensures that there has been no double counting/ repetition of the beneficiary information, location and unique identification number of the cook stoves. The database is updated on a regular basis to include:
    a. Replacement of the cook stoves after schedule life time
    b. Scheduled maintenance
    c. Unscheduled maintenance or fault rectification measures undertaken
    d. Temporary or permanent drop out

Finalizing the number of cook stoves for emission reduction estimation
As described in the section above in regard to the implementation arrangement and record archiving the dissemination of the cook stove to the household and its usage thereafter includes the following steps:

1. Signing of end user agreement
2. Dissemination of improved cookstoves

In accordance to the guidance of the methodology, emission reduction as against each cook stoves can only be estimated from the point of cook stove usage. Therefore, the date of dissemination of cook stoves and signing of the end user agreement with each beneficiary after dissemination is considered as the date from where the emission reduction calculation is initiated for each cook stove for the first monitoring period. For the purpose of estimation, the end date of cookstoves dissemination is considered as start date of the monitoring period.

Management of monitoring activities
The monitoring of the project activity is reviewed and coordinated by the top management of the Project Participant (GKEMPL) through Monitoring Coordinator, team of Project Participant (GKEMPL) headed by Project Director and technical team from Vikram Stoves.

The persons and staffs involved in monitoring is trained over the procedure in accordance to the manual and works out under the supervision of the Project Director. The major task to be undertaken and the responsibility are as follows:

1. Co-ordinator: Each coordinator acts as coordinating point between the project household and the Team (respective manger). The village coordinator is responsible to facilitate and oversee continual operation of cook stoves, maintain database related to number of cook stoves distributed and replaced thereafter, filing complain relating to non-functioning and undertaking on-call maintenance, recording of the complaint and maintenance time line and periodic submission of information to the team.
2. Team: Creating and maintaining database and end user agreement, up-gradation of beneficiary level information in the central database. The team monitors related information pertaining to the replacement of the cook stoves[14]. In case household considered under the project activity fails to meet the condition of the end user agreement or household drops out (because of the shift to location outside project boundary for employment purpose/migration for a temporary period or even the beneficiary decided to discontinue usage of improved cook stoves) then, such dropout household is conservatively deducted on temporary or permanent basis from the emission reduction calculation for the particular monitoring period. The VCS team is responsible for estimating the emission reduction.
3. Maintenance team – Vikram Stoves is responsible for imparting training relating to the cook stove scheduled maintenance and undertaking periodic maintenance and on-call maintenance.
4. Daily usage- Household uses cook stove and intimate from time to time relating to non- functioning or temporary transfer/migration. The coordinator on basis of the usage report intimates the team.
5. Replacement of Existing improved cook stoves: In case the old cook stove is replaced by a new cook stove the same is to be done with similar or higher efficiency of existing cook stove (29.88%). On replacement a new end user agreement is signed with the existing end user the same information relating to the replacement along with necessary details is updated in the database. The copy of the new end user agreement for the replaced cook stove along with the efficiency certificate of the new system is archived along with the existing agreement. The database is updated as and when the system is replaced. The replaced cook stoves is dismantled and sold out to the cast iron and steel units respectively in order to recycle the system components. Such initiatives nullify the chances of the replaced cook stove to be re-used.

Monitoring of Traditional cook stove usage

The traditional cook stove is considered as an auspicious with religious value and household consider it as a linkage to their tradition so, the household has kept the stove. However, each household has assured and confirmed through signing of end user agreement with the project participant to continue using of improved cook stoves at household.

However, as a conservative approach to monitor fuel wood consumption in the project household from use of existing mud cook stove, third party survey is carried out of

[14] The replaced cook stoves is to dismantled and sold out to the cast iron and steel units respectively in order to recycle the system components. Such initiatives nullifies the chances of the replaced cook stove to be re-used.

representative sample household on annual basis to evaluate the number of days for which the traditional stoves has been operated across the year. The number of days for which the traditional stoves were in operation is used to derive the factor to be adjusted with B_{old}. The factor is calculated as follows:
= (365 – Average No. of days of traditional cook stoves usage in all households) /365

The factor calculated using above approach is multiplied with B_{old} to calculate the value of B_{old} to be used for ex-post calculation of emission reduction.

Sampling design

Objective: The objective of the sample design is to determine –

a) **Efficiency of Improved cook stove in operation:** Efficiency of the system is tested by third party agency of a representative sample on principle of the Water Boiling Test Protocol indicated in IS 13152 (Part 1): 1991.
b) **Usage Survey** – This is conducted on annual basis to determine the number of cook stove in operation. The survey is initiated after a year from date of project registration.
c) **Usage of traditional cook stoves**: The survey is conducted to determine the number of days for which the household is using the traditional cook stoves.

Reliability Requirement: As per paragraph 22 of the approved methodology AMS - II.G; 90% confidence interval and 10% margin of error needs is considered conceiving the fact that survey is carried out on an annual basis.

Target Population: The number of cook stove conceived under the project activity is 14,517

Survey Method: Simple Random sampling is chosen, as the population under the project activity are homogeneous owing to the selection of beneficiary from similar socio-economic circumstances.

Sample Size:

The sample size is calculated using exact equation for random sampling –

$n \geq 1.6452N * p * (1-p) / ((N-1) * 0.12 * p2 + 1.6452 * p*(1-p))$

Where,

N	=	Sample size
N	=	14,517
P	=	expected proportion (on basis of assumption that, 90% of the cook stove is in operation and at the desired efficiency)
1.645	=	Represents 90% confidence required
0.1	=	Represent 10% relative precision

a) Sample size for Efficiency test

Although the cook stoves are designed to operate at a desired efficiency level throughout its life time subjected to periodic maintenance; efficiency test of the cook stoves is carried out on annual basis. The sample size for undertaking efficiency test is therefore, decided considering 90% of the cook stoves operates at a specified efficiency of 29.88%.

Following equation (3) above, the number of sample size arrived as below –

Time Period	**Percentage of cook stove operational at specified efficiency at any point of time during the entire crediting period** (*This assumption is only for estimation of sample size*)[62]	**Sample size for survey (No. of systems)**	**Sample size after conceiving response rate of 80%**
Annual	90%	31	40

(Note: the final sample size is rounded up and increased to the next closest integer)

The household for testing the efficiency as stated above is selected on a random sample basis. However while undertaking the sample beneficiary selection it is ensured that the household opted for efficiency testing are not common with the household /beneficiary selected for sample survey for improved cook stove usage and traditional cook stove usage during a particular year. Moreover, it is ensured that the household once selected for efficiency testing during a particular year is opted out from the selection procedure in course of the crediting period for further testing.

Data to be collected -

Field Measurement – Frequency: The efficiency testing of sample system is carried out on an annual basis. The inspection is carried out one year after the date of registration. There after once in every year the survey is conducted.

QA/QC Procedure: Each system is assigned with unique identification details. The systems to be sampled is randomly selected using software or random number tables and screen shots of the same is kept in the data base. The PP gets the services of third party agency or any scope accredited DOE including the verifier for conducting the efficiency test of the samples presented by the PP before the preparation of the monitoring report.

Analysis: In case of the efficiency tested for the sample system is found to be lower than 29.88% then, the minimum value of efficiency tested is considered as a threshold for the subsequent years in place of 29.88% till the point further lower value of efficiency is tested.

b) Sample size determination for no. of improved cook stoves in operation and no of days of traditional cook stove usage

The sample size is estimated for determining the number of cook stoves in operation on basis of assumption that, 90% (This assumption is only for estimation of sample size) of cook stove is operational i.e. proportion of the cook stove in operation during a particular year is 0.9.

Therefore, n≥ 31

For covering 100 percent of the sample and expecting a response rate of 80%. Thus, the sample size is estimated as 31/80% = 39. However, to cover the wide range of population and have a conservative sample the PP selects 4 times the number of sample estimated i.e., 156 numbers of household every year for the sample.

The household survey is designed to estimate the percentage of cook stove still in operation and number of days for which the traditional cook stoves are used for the purpose of estimation of emission reduction. The survey questionnaire essentially contain the unique identification details of the household, satisfactory level of usage and service, date of signing of the agreement, information regard to the maintenance or replacement if any, number of person in the household, other type of stoves used if any (type of fuel) and number of days of traditional cook stove usage (specific details about the festive season and any other occasion the traditional cook stove is

used, if the size of the members are extremely high when it is not possible to use the improved cook stove).

It is to be noted that the household selected for the usage survey for determination of proportion of cook stove in operation is common where the survey for determining the number days for which the traditional cook stoves usage is carried out. The samples once surveyed in a year is not considered for subsequent year.

Data to be collected

Field Measurement – Frequency: The survey is carried out on an annual basis from the date of registration in specified format duly signed by the beneficiary to assess whether the beneficiary has been using the cook stoves distributed till date and to assess the number of days for which the beneficiary has used the traditional cook stoves during that year.

QA/QC Procedure: Each system is assigned with unique identification details. The systems to be sampled is randomly selected using software or random number tables and screen shots of the same is kept in the data base. The PP gets the services of third party agency or any scope accredited DoE including the verifier for taking the survey before the preparation of the monitoring report.

Analysis: Based on the response the percentage of improved cook stoves which are distributed as the part of this project activity that are still operated by the households and the average number of days of operation of the traditional cook stoves by each household would be estimated and the same is considered for ex-post emission reduction calculation.

The sample beneficiaries/household is same where the survey is carried out for estimation of operation of improved cook stoves and traditional cook stoves i.e. a single survey is designed to capture both. Moreover, it is ensured that the household once selected for survey during a particular year is opted out from the selection in course of the subsequent crediting period for further testing.

Sl. No.	Description	Data to be collected	Method of survey	Sampling method	Proposed Sample size	Variance
1	Efficiency of Improved cook stove	Testing of the Efficiency of the improved cook stoves	Household Collection and conducting the test for the selected samples.	Simple Random sampling	40	90% Confidence level
2	Usage survey	No of system in operation	Household survey	Simple Random Sampling	160 household/ annum	90% confidence level
	Traditional cook stove usage	No of days for which the household use traditional cook stoves are used in the project household	Household survey	Simple Random Sampling	160 household/ annum	90% confidence level

Reliability Check

The sample size as indicated in the table above is subjected to the final value of the precision calculated and in case the value of the precision estimated from the survey result is less than ±10%

then, the sample size is re-estimated and the additional number of beneficiary/households is interviewed to obtain the desired level of precision. The precision is calculated as follows:

Step1: Estimation of the value of proportion (p)
P = number of success/ number of cook stoves that were observed in the sample

Step 2: Estimating Standard Error of the proportion
The standard error of the proportion is estimated using the following equation Standard error of proportion = $\sqrt{}$(1-f) pq/n
Where,
f = sampling fraction = number of cook stoves that are observed in the sample/14,517, i.e., 160/14,517. p = proportion, 90%
q = (1-p)
n = number of cook stoves that are observed in the sample

Step 3: Estimating of Precision
Proportion=±z value * standard error of proportion
z value = for 90% confidence level the value of z is 1.645 Standard error of proportion = estimated in step 2

Step 4: Estimating of Relating Precision Relative Precision = Precision/proportion Where,
Proportion is estimated in step 1 and precision in step 3
In case the value of the relative precision estimated based on the level of success relating to

1. Tested Efficiency of the improved cook stove being equal to greater than 29.88%
2. Number of the beneficiaries using improved cook stove
3. Number of beneficiaries/households using traditional cook stoves is not within the specified limit of ±10% the value of sample size is increased and survey is carried out amongst the additional population to obtain the desired level of precision i.e. within ±10%.

Training
The training is imparted to the following entities in following way-

Entity	Objective of training	Trained by	Onset	Frequency
Household	Operational procedure Scheduled maintenance Itemised recording and reporting	Vikram Stoves (for item no 1. and 2) team (for item 3)	After distribution	Once
Village Coordinator	Monitoring of the related parameter like Spot check of cook stove usage, situational review Database management and coordination with team System Maintenance	VCS team (for item no. 1 and 2) Vikram Stoves (for item 3)	On appointment	Once in a year
VCS team	Database management Undertaking Monitoring, Recording and archiving Preparation of monitoring report	Consultant and Top Management of the Project participant	On registration	Once in a year

Quality Assurance and Quality Control of monitoring activities–

Top management of the Project participant (GKEMPL) is responsible for QA/QC which includes monitoring of accurate and transparent record keeping, monitoring and evaluation so that all supporting documentation and records for the project is easily accessible for spot checking and cross referencing by a third-party agency. Top management of the project participant ensures quality control of the monitoring activities in order to guarantee of records and to confirm absence of double-counting in any form. Project participant ensures that, the detailed beneficiary level database and the project database is up to date and the latter is representative of the most recent definitions of clusters. Internal audit is carried out on six month basis by the consultant or third party agency and includes -

1. The internal review is carried out in every six month for compliance check in accordance to the manual.
2. Non conformity if noted is reported and brought into the notice of the top management and measures is undertaken to ensure that required compliance is met.
3. Training on the monitoring if felt by the auditor is imparted to the team.

Emergency Preparedness

In case the village coordinator is reported against malfunction/ non-function of cook stove which the technical team is unable to rectify the fault and unable to co-ordinate with the technical team of Vikram Stoves; the coordinator immediately replace the existing cook stove with the new one. The faulty stoves thereafter be transported to the industry for repair.

1. The coordinator is provided with stand-by stove components for repair and/or replacement.
2. Few numbers of cook stoves are stocked with the Panchayat Samity/ Block Development Office to reduce the down time of replacement.
3. In case the coordinator is unable to carry out maintenance, the same is reported to the technical team of Vikram Stoves and the nearby representatives visits the village to support the co- Ordinator in rectifying the fault.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline Emissions is estimated in following way –

$ER_y = B_{y,\ savings} * f_{NRB,y} * NCV_{\ biomass} * EF_{projected\ fossil\ fuel}$

Where, in accordance to paragraph 13 of the methodology, leakage related to the non-renewable woody biomass saved by the project activity is assessed based on ex post surveys of users and the areas from which this woody biomass is sourced. Subsequent to the clarification provided in sub paragraph (a) survey is not required for ex-post estimation of leakage in case B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for leakages.

Parameter	Data	Unit
B_{old}	1.469	Tonne fuel wood /cook stove/ year
$B_{y,\ savings}$	0.9774	Tonne fuel wood /cook stove/ year
$f_{NRB,y}$	87.90%	

$NCV_{biomass}$	0.015	TJ/tonne
$EF_{projectedfossilfuel}$	81.60	tCO_2e/TJ
$ER_{y,WGA,per\ cook\ stove}$ (Emission reduction/ cook stove /year without gross adjustment factor for B_{old} to account for leakage)	1.0515	tCO_2e /cook stove/ year

The leakage emission for ex-ante estimation of emission reduction is thereby calculated as a difference between the emission reduction estimated considering the actual value of Bold i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of Bold is estimated by multiplying Bold with a net to gross adjustment factor of 0.95.

For the purpose of ex-ante estimation of emission reduction, it is assumed that, only 90% of the cook stoves are operational in any point of time. Thus, the emission reduction per year ($ER_{y,\ WGA}$) without gross adjustment factor for B_{old} to account for leakage considering 90% of the cook stove as operational for the entire crediting period is 13,737 tCO_2e /year.

The Baseline Emissions achieved for this monitoring period is 64,801 tCO_2e /year.

The year wise efficiency of the improved cookstoves tested and considered for estimation of baseline emission is outlined in the table below

Third party assessment for monitoring period – Year 1			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-3571	Bansiram Zabu Chavan	Latur	28.561%
GKEMPLPH-14-2002	Baliram Narayan Borkar	Beed	28.610%
GKEMPLPH-14-5912	Manohar Anant Satbhai	Washim	28.643%
GKEMPLPH-14-4070	Bandu Shankarrao Solanke	Buldhana	28.671%
GKEMPLPH-14-8517	Shrinivas Vishwasrao Deshmukh	Nagpur	28.684%
GKEMPLPH-14-3458	Asaram Sahebrav Mayakar	Osmanabad	28.693%
GKEMPLPH-14-4045	Sandip Prabhakar Navghare	Buldhana	28.702%
GKEMPLPH-14-13130	Sopan Pralhad Gawhane	Gondia	28.720%
GKEMPLPH-14-7034	Shila Gajanan Bhimte	Yavatmal	28.794%
GKEMPLPH-14-1599	Santosh Kanhuji Lunge	Parbhani	28.797%
GKEMPLPH-14-651	Vitthal Sakharam Gote	Aurangabad	28.824%
GKEMPLPH-14-12265	Josana Narayan Ile	Gadchiroli	28.835%
GKEMPLPH-14-14233	Dilip Tatyarao Avachar	Gondia	28.858%
GKEMPLPH-14-857	Sachin Shivaji Shinde	Jalna	28.880%
GKEMPLPH-14-1885	Mahadev Rajaram Bobade	Hingoli	28.888%
GKEMPLPH-14-12281	Nikhil Keshavrao Gawali	Gadchiroli	28.934%
GKEMPLPH-14-7985	Kondabai Laxmanrao Sargar	Nagpur	28.939%
GKEMPLPH-14-583	Sanjay Sadashiv Chaudhari	Aurangabad	28.958%
GKEMPLPH-14-7262	Atmaram Ishnaji Kokate	Wardha	29.036%
GKEMPLPH-14-6881	Gopal Pandurang Hisekar	Yavatmal	29.042%
GKEMPLPH-14-1953	Sampat Tukaram Poghe	Hingoli	29.100%
GKEMPLPH-14-6466	Yogesh Bhimarav Nemane	Amravati	29.143%
GKEMPLPH-14-5687	Mahipati Anna Devgade	Washim	29.159%
GKEMPLPH-14-2001	Bhaskar Anandrao Vavare	Beed	29.184%

Third party assessment for monitoring period – Year 1			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-12301	Anjanabi Dhanaji Kapse	Gadchiroli	29.200%
GKEMPLPH-14-9175	Malubai Bhagavat Bamhande	Bhandara	29.236%
GKEMPLPH-14-6250	Shalikram Narayan Nagulkar	Amravati	29.260%
GKEMPLPH-14-2333	Prataprao Manikrao Chavan	Nanded	29.264%
GKEMPLPH-14-9994	Narayan Devji Walukar	Chandrapur	29.274%
GKEMPLPH-14-13156	Sugandhabai Dattrao Magar	Gondia	29.321%
GKEMPLPH-14-11472	Mahesh Radheshyam Mandhane	Gadchiroli	29.343%
GKEMPLPH-14-9697	Sasdashiv Diganbar Puri	Bhandara	29.486%
GKEMPLPH-14-7372	Lata Ravindra Kalpande	Wardha	29.501%
GKEMPLPH-14-4766	Narayan Bapurao Malwad	Akola	29.515%
GKEMPLPH-14-4278	Sandeep Bhagwan Dhore	Akola	29.599%
GKEMPLPH-14-13698	Rukhmina Panjabrao Khadse	Gondia	29.604%
GKEMPLPH-14-10018	Shamrao Maroti Ambhore	Chandrapur	29.606%
GKEMPLPH-14-11591	Shobha Arun Thakare	Gadchiroli	29.674%
GKEMPLPH-14-3733	Kusumbai Shrimant Mandve	Latur	29.775%
GKEMPLPH-14-4881	Bhagwan Babasaheb Ghule	Washim	29.882%

Third party assessment for monitoring period – Year 2			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-3222	Natha Ishnaji Ambhore	Osmanabad	27.810%
GKEMPLPH-14-3396	Parmeshwar Tukaram Sangale	Latur	27.937%
GKEMPLPH-14-8097	Wamanrav Ganeshrav Munde	Nagpur	27.968%
GKEMPLPH-14-14204	Manisha Santosh Mantri	Gondia	28.151%
GKEMPLPH-14-1277	Badri Netaji Dahalake	Parbhani	28.187%
GKEMPLPH-14-2006	Kailas Mahadev Khandare	Beed	28.307%
GKEMPLPH-14-1916	Chandrakala Bapurao Raut	Hingoli	28.340%
GKEMPLPH-14-12131	Eknath Kondji Chavhan	Gadchiroli	28.389%
GKEMPLPH-14-9646	Parmeshwar Shivaji Famade	Bhandara	28.443%
GKEMPLPH-14-1711	Santosh Vitthal Mahale	Hingoli	28.481%
GKEMPLPH-14-4084	Atmaram Maruti Lawate	Buldhana	28.486%
GKEMPLPH-14-7338	Sujeet Sureshrao Sonwane	Wardha	28.492%
GKEMPLPH-14-7100	Vishwaraj Vishnu Bargaje	Yavatmal	28.643%
GKEMPLPH-14-5089	Gajanan Govinda Thakare	Washim	28.666%
GKEMPLPH-14-10006	Gitabai Bhaskar Shinde	Chandrapur	28.666%
GKEMPLPH-14-6550	Rameshwar Sampat Mahale	Amravati	28.708%
GKEMPLPH-14-7330	Bhagavan Haribhau Suravase	Wardha	28.716%
GKEMPLPH-14-4771	Suresh Dhonduji Tirake	Akola	28.722%
GKEMPLPH-14-346	Kisan Ananda Khodke	Aurangabad	28.730%
GKEMPLPH-14-10681	Jagannath Rama Tade	Chandrapur	28.733%
GKEMPLPH-14-6277	Vijay Baliram Bajad	Amravati	28.745%
GKEMPLPH-14-14067	Gorakshanath Padmakar Chavan	Gondia	28.800%
GKEMPLPH-14-4750	Vishwanath Madhav Ingale	Akola	28.907%
GKEMPLPH-14-5028	Ashok Balasaheb Tonde	Washim	28.919%
GKEMPLPH-14-7895	Shriram Shankar Bajad	Nagpur	28.967%
GKEMPLPH-14-7018	Ratan Shriram Pangare	Yavatmal	28.973%
GKEMPLPH-14-8788	Raju Kisan Chavhan	Bhandara	29.007%

Third party assessment for monitoring period – Year 2			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-4037	Sambhaji Manik Bade	Buldhana	29.036%
GKEMPLPH-14-2005	Vitthal Laxamn Wanare	Beed	29.108%
GKEMPLPH-14-13585	Radhesham Maniram Chavhan	Gondia	29.145%
GKEMPLPH-14-634	Akash Ramesh Thakare	Aurangabad	29.205%
GKEMPLPH-14-11001	Pandit Amrut Mugutrao	Gadchiroli	29.205%
GKEMPLPH-14-5403	Sanosh Bharat Mate	Washim	29.220%
GKEMPLPH-14-2418	Raghoji Babarao Rathod	Nanded	29.379%
GKEMPLPH-14-1052	Umabai Gangaram Waghmode	Jalna	29.393%
GKEMPLPH-14-12203	Nirjala Dhondu Debaje	Gadchiroli	29.401%
GKEMPLPH-14-10878	Somanath Vishwanath Raut	Gadchiroli	29.430%
GKEMPLPH-14-12612	Ganpat Dagdu Bharti	Gadchiroli	29.457%
GKEMPLPH-14-12754	Shivaji Dnyanoba Ghule	Gondia	29.601%
GKEMPLPH-14-2898	Lodu Kundlik Bajad	Latur	29.608%

Third party assessment for monitoring period – Year 3			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-12455	Kauslya Himmtrav Avchar	Gadchiroli	27.107%
GKEMPLPH-14-8299	Sandipan Munjaji Gavhane	Nagpur	27.111%
GKEMPLPH-14-1845	Zendurao Wamanrao Ghuge	Hingoli	27.125%
GKEMPLPH-14-13967	Vilas Tukaram Shrikhande	Gondia	27.144%
GKEMPLPH-14-3900	Maroti Ashok More	Latur	27.166%
GKEMPLPH-14-6066	Dnyaneshwar Babasaheb Binage	Washim	27.171%
GKEMPLPH-14-1989	Mahadev Kisanrao Avgan	Hingoli	27.184%
GKEMPLPH-14-11299	Subhash Devrao Gite	Gadchiroli	27.188%
GKEMPLPH-14-8516	Sitaram Ramdas Chavhan	Nagpur	27.192%
GKEMPLPH-14-4100	Surybhan Govindrao Ware	Buldhana	27.194%
GKEMPLPH-14-77	Bhagwan Pandhri Khodke	Aurangabad	27.196%
GKEMPLPH-14-4285	Sudam Ramkisan Zingare	Akola	27.216%
GKEMPLPH-14-10530	Santosh Bhaurao Khadase	Chandrapur	27.245%
GKEMPLPH-14-7584	Mandar Shahaji Wayse	Wardha	27.283%
GKEMPLPH-14-4957	Haribhau Prakash Kakade	Washim	27.304%
GKEMPLPH-14-2009	Munjahari Vithoba Hoke	Beed	27.309%
GKEMPLPH-14-6230	Ramdas Shankar Dhurde	Amravati	27.318%
GKEMPLPH-14-10866	Narayan Bapurao Otle	Gadchiroli	27.321%
GKEMPLPH-14-5046	Dilip Laxman Raut	Washim	27.352%
GKEMPLPH-14-2868	Yashwant Bhanudasrao Alane	Osmanabad	27.379%
GKEMPLPH-14-10290	Baban Shahadev Ghallal	Chandrapur	27.394%
GKEMPLPH-14-4093	Digambar Umrao Raut	Buldhana	27.402%
GKEMPLPH-14-6856	Prakash Motiram Mohale	Yavatmal	27.438%
GKEMPLPH-14-6778	Mahadev Haribhau Dake	Yavatmal	27.441%
GKEMPLPH-14-6511	Rahul Ganeshrao Mulate	Amravati	27.545%
GKEMPLPH-14-553	Bapurao Namdeo Ugle	Aurangabad	27.563%
GKEMPLPH-14-2408	Ravsaheb Ranganath Chavan	Nanded	27.639%
GKEMPLPH-14-4754	Rekha Amruta Gawali	Akola	27.647%
GKEMPLPH-14-13290	Madhukar Narhari Thorat	Gondia	27.647%
GKEMPLPH-14-9184	Vijay Rambhau Raut	Bhandara	27.647%
GKEMPLPH-14-1596	Mangesh Prakash Aghav	Parbhani	27.657%

GKEMPLPH-14-3654	Sanjay Kashiram More	Latur	27.668%
GKEMPLPH-14-12420	Indira Madhukar Ingole	Gadchiroli	27.676%
GKEMPLPH-14-12591	Santosh Kisanrao Ambhore	Gadchiroli	27.690%
GKEMPLPH-14-9482	Indrawani Ashruba Munde	Bhandara	27.693%
GKEMPLPH-14-13273	Navnath Shrirang Lonkar	Gondia	27.725%
GKEMPLPH-14-2010	Manikrao Rustumrao Wagh	Beed	27.728%
GKEMPLPH-14-1029	Sushila Sesharao Walukar	Jalna	27.752%
GKEMPLPH-14-14218	Krushna Vitthal Gaware	Gondia	27.830%
GKEMPLPH-14-7547	Ashok Yadav Waghmare	Wardha	27.991%

Third party assessment for monitoring period – Year 4			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-11663	Babarao Ramji Manwr	Gadchiroli	26.197%
GKEMPLPH-14-4420	Namdeo Nagoji Gaikwad	Akola	26.211%
GKEMPLPH-14-9753	Sakhre Gita Pralhad	Chandrapur	26.320%
GKEMPLPH-14-4010	Baliram Tryambak Billari	Buldhana	26.348%
GKEMPLPH-14-2915	Shrirang Janardhan Kuchekar	Osmanabad	26.381%
GKEMPLPH-14-2460	Bhimashankar Baburav Taur	Nanded	26.407%
GKEMPLPH-14-2013	Subhash Ravsaheb Jogdand	Beed	26.416%
GKEMPLPH-14-6808	Maroti Vitthal Thakare	Yavatmal	26.427%
GKEMPLPH-14-4935	Santosh Singh Bais	Washim	26.462%
GKEMPLPH-14-1831	Sadhu Kisan Kharat	Hingoli	26.465%
GKEMPLPH-14-9156	Sahebrav Rambhau Kambale	Bhandara	26.473%
GKEMPLPH-14-3790	Radeshyam Madhukar Katyarmal	Latur	26.524%
GKEMPLPH-14-13075	Vitthal Shankarrao Dhapase	Gondia	26.584%
GKEMPLPH-14-6085	Ram Vasantrao Wakudkar	Amravati	26.592%
GKEMPLPH-14-14050	Ashok Dharmaraj Mane	Gondia	26.640%
GKEMPLPH-14-8577	Aruna Himat Bhosale	Nagpur	26.650%
GKEMPLPH-14-834	Ramkrushna Sakharamji Kalapad	Jalna	26.703%
GKEMPLPH-14-4158	Rushikesh Purushottam Bhojane	Buldhana	26.758%
GKEMPLPH-14-3539	Khushal Nandu Pawar	Latur	26.792%
GKEMPLPH-14-7734	Gajanan Narayan Nawghare	Wardha	26.828%
GKEMPLPH-14-8364	Gangadhar Nivrutti Doifode	Nagpur	27.005%
GKEMPLPH-14-7511	Mukund Murlidhar Thopte	Wardha	27.060%
GKEMPLPH-14-2014	Prabhawati Ashruba Dhobale	Beed	27.085%
GKEMPLPH-14-4837	Rajabhau Laxman Kadam	Akola	27.185%
GKEMPLPH-14-1580	Indubai Adinath Bhosale	Parbhani	27.228%
GKEMPLPH-14-6994	Vitthal Tulshiram Dhurandhare	Yavatmal	27.250%
GKEMPLPH-14-14214	Haribhau Piraji Valale	Gondia	27.289%
GKEMPLPH-14-9810	Buddhu Nura Gaurave	Chandrapur	27.290%
GKEMPLPH-14-78	Vitthal Shreeram Dhobale	Aurangabad	27.359%
GKEMPLPH-14-11832	Kailas Sakharam Borkar	Gadchiroli	27.361%
GKEMPLPH-14-12449	Sanjivani Vishvanath Saraf	Gadchiroli	27.514%
GKEMPLPH-14-10922	Abbubakar Hayat Shaikh	Gadchiroli	27.623%
GKEMPLPH-14-8829	Bhausaheb Baburao Borkhede	Bhandara	27.624%
GKEMPLPH-14-13205	Gorakhnath Pandurang Jadhav	Gondia	27.661%
GKEMPLPH-14-333	Arun Gangaram Bhoganwad	Aurangabad	27.701%
GKEMPLPH-14-11801	Satyanarayan Dattatray Kadam	Gadchiroli	27.734%
GKEMPLPH-14-5257	Padmashinh Haribhau Gaikwad	Washim	27.737%

Third party assessment for monitoring period – Year 4			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-1722	Eknath Fakira Meratkar	Hingoli	27.876%
GKEMPLPH-14-6167	Vishwambhar Laxman Lungare	Amravati	28.042%
GKEMPLPH-14-5527	Deepak Gajendr Naikawade	Washim	28.371%

Third party assessment for monitoring period – Year 5			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-5253	Swati Udyasinh Patil	Washim	26.072%
GKEMPLPH-14-5541	Amol Krishnrao Wawre	Washim	26.106%
GKEMPLPH-14-13828	Satwa Dhondiba Mate	Gondia	26.113%
GKEMPLPH-14-11889	Sheshrao Sampat Adhav	Gadchiroli	26.113%
GKEMPLPH-14-10193	Ramnath Vishwanath Shinde	Chandrapur	26.124%
GKEMPLPH-14-6150	Anil Ankush Thorat	Amravati	26.186%
GKEMPLPH-14-2018	Sakharam Deoba Vanaskar	Beed	26.189%
GKEMPLPH-14-11292	Renukabai Ramrao Adhav	Gadchiroli	26.240%
GKEMPLPH-14-6866	Shalubai Madhukar Rao Deshmukh	Yavatmal	26.267%
GKEMPLPH-14-681	Bhimrao Champatrao Sawarkar	Aurangabad	26.272%
GKEMPLPH-14-9152	Rajesh Vitthal Mahale	Bhandara	26.288%
GKEMPLPH-14-4047	Madhukar Rama Jadhav	Buldhana	26.345%
GKEMPLPH-14-6777	Narayan Kashiba Ugale	Yavatmal	26.352%
GKEMPLPH-14-10174	Damodar Gomaji Tatake	Chandrapur	26.368%
GKEMPLPH-14-12202	Shilabai Arun Vakade	Gadchiroli	26.376%
GKEMPLPH-14-10726	Uttam Munjaba Korde	Gadchiroli	26.406%
GKEMPLPH-14-4421	Balu Trimbak Chavan	Akola	26.442%
GKEMPLPH-14-7543	Parvatibai Ramesh Bahute	Wardha	26.493%
GKEMPLPH-14-6426	Nanda Bhavrao Korade	Amravati	26.503%
GKEMPLPH-14-5952	Kondiram Eknathrao Parhad	Washim	26.509%
GKEMPLPH-14-8573	Rameshwar Sahebrao Gote	Nagpur	26.550%
GKEMPLPH-14-12761	Pravin Vikas Karade	Gondia	26.551%
GKEMPLPH-14-3718	Shrinag Ashruji Pund	Latur	26.592%
GKEMPLPH-14-7217	Govind Janardhan Adkar	Wardha	26.668%
GKEMPLPH-14-13005	Pradip Govardhan Saruk	Gondia	26.708%
GKEMPLPH-14-8965	Yogesh Dattatray Vavre	Bhandara	26.713%
GKEMPLPH-14-11253	Shamatai Chandrakiran Bhingare	Gadchiroli	26.741%
GKEMPLPH-14-2017	Shankar Shivram Kendre	Beed	26.928%
GKEMPLPH-14-2756	Ashwini Rama Karale	Nanded	27.019%
GKEMPLPH-14-4447	Rajabai Shivaji Jagtap	Akola	27.128%
GKEMPLPH-14-7879	Sudhakar Jijeba Mawal	Nagpur	27.261%
GKEMPLPH-14-3209	Bajrang Bhausaheb Jagtap	Osmanabad	27.270%
GKEMPLPH-14-1004	Bhagavan Kondirram Maykar	Jalna	27.390%
GKEMPLPH-14-4072	Pravin Bhairulal Laddha	Buldhana	27.472%
GKEMPLPH-14-678	Radhabai Murlidhar Thoke	Aurangabad	27.491%
GKEMPLPH-14-3887	Vishnu Sopan Thakre	Latur	27.615%
GKEMPLPH-14-1991	Sandeep Vitthal Khadke	Hingoli	27.693%
GKEMPLPH-14-13056	Pralhad Govind Kolhe	Gondia	27.720%
GKEMPLPH-14-1427	Suresh Kisan Korde	Parbhani	28.072%

Third party assessment for monitoring period – Year 5			
Identification number	**Beneficiary name**	**District**	**Tested Efficiency**
GKEMPLPH-14-1839	Vishnu Laxman Puri	Hingoli	28.831%

5.2 Project Emissions

Project emissions are considered as zero for this project as no fossil fuels are used

5.3 Leakage

The leakage emission per cook stove is estimated as difference between the emission reduction estimated considering the actual value of Bold and emission reduction estimated considering the value of Bold obtained by multiplying Bold with a net to gross adjustment factor of 0.95.

Parameter	Data	Unit
Leakage emission	0.053	tCO_2e /cook stove/ year
Leakage emission due to use of traditional cook stove usage (assuming 0 for ex-ante)	0	tCO_2e /cook stove/ year
Leakage emission, (LEy, per cook stove)	0.053	tCO_2e /cook stove/ year

Therefore, the total leakage emission (LEy) for the project activity assuming 90% of 14,517 Nos. cook stove distributed is 687 tCO_2e /year.

The leakage emissions achieved for this monitoring period is 3,242 tCO_2e /year.

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
04-Oct-2012 -03-Oct-2013	11,515	0	576	10,939
04-Oct-2013 -03-Oct-2014	13,957	0	698	13,259
04-Oct-2014 -03-Oct-2015	13,482	0	675	12,807
04-Oct-2015 -03-Oct-2016	13,031	0	652	12,379
04-Oct-2016 -03-Oct-2017	12,816	0	641	12,175
Total	64,801	0	3,242	61,559

Comparison with the actual emission reductions achieved with the estimated emission reductions:

Duration	Net emission reduction for the project activity in the year y, ER_y	Estimated Emission Reductions	Comparison
04-Oct-2012 -03-Oct-2017	61,559	65,250	-6.00%