



DISTRIBUTION OF IMPROVED COOK STOVE - PHASE 24



Document Prepared by EKI Energy Services Limited

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Project Title	Distribution of Improved cook stove - Phase 24
Version	04
Report ID	VVER 344
Date of Issue	04-October-2022
Project ID	VCS 2442
Monitoring Period	09-October- 2012 to 08-October-2017 (First and Last date included)
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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 pollution¹ along with reduction of drudgery amongst the tribal households (Schedule Tribe) and families living below the poverty level (BPL category²) 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 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 NSSO³ 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 thermal energy losses and facilitating complete combustion. Reduced consumption/combustion of non-renewable biomass results in reduction of GHG emission.

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 04

Technology Employed

The cook stove deployed under the project activity⁶ is single pot, portable, metallic, improved biomass cook stoves⁷ 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 I⁸ 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 14,100 Nos. improved cook stoves¹⁰ 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 upon signing of the end user Tripartite Agreement¹¹. The project through conservation of non-renewable biomass was estimated to result in an greenhouse gas emission reduction of 12,675 tCO₂e 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

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.

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

and training, periodic maintenance¹² and post lifetime replacement within the crediting period.

The amount of emission reductions achieved for the current monitoring period is 59,605 tCO₂e.

The start date of the project activity is 09-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
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Telephone	+91-997045
Email	gopal@energymarketers.in

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

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.

Telephone	+91- 7828347589
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1.5 Project Start Date

The start date of the project activity is 09-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 is 09-October- 2012 to 08-October-2022 (both dates inclusive). The improved cookstoves distributions were carried out between 09-October-2012 to 17-December- 2012 amongst 14,100 beneficiaries.).

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 list of division is given below:

Division: Aurangabad,

Districts: Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur

Division: Amravati and

Districts: Buldhana, Akola, Washim, Amravati, Yavatmal,

Division: Nagpur

Districts: Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia

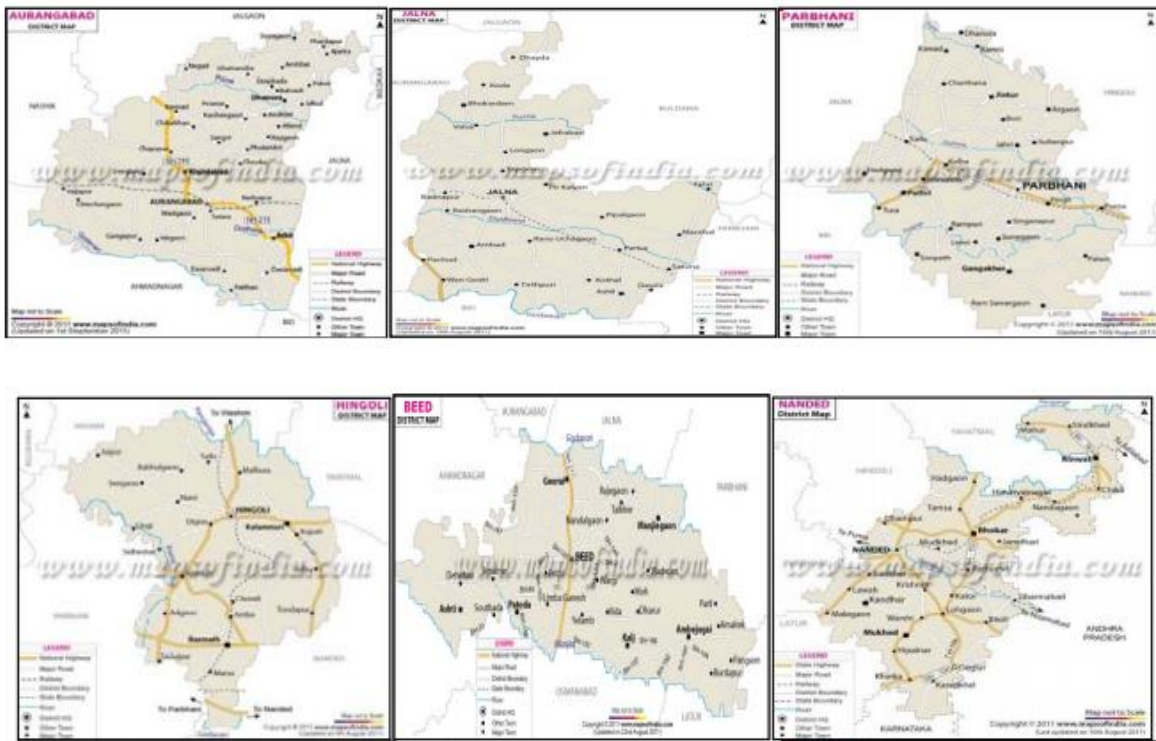
Division	District	Latitude	Longitude
Aurangabad	Aurangabad	19.00 – 20.00 °N	74.00 – 76.00 °E

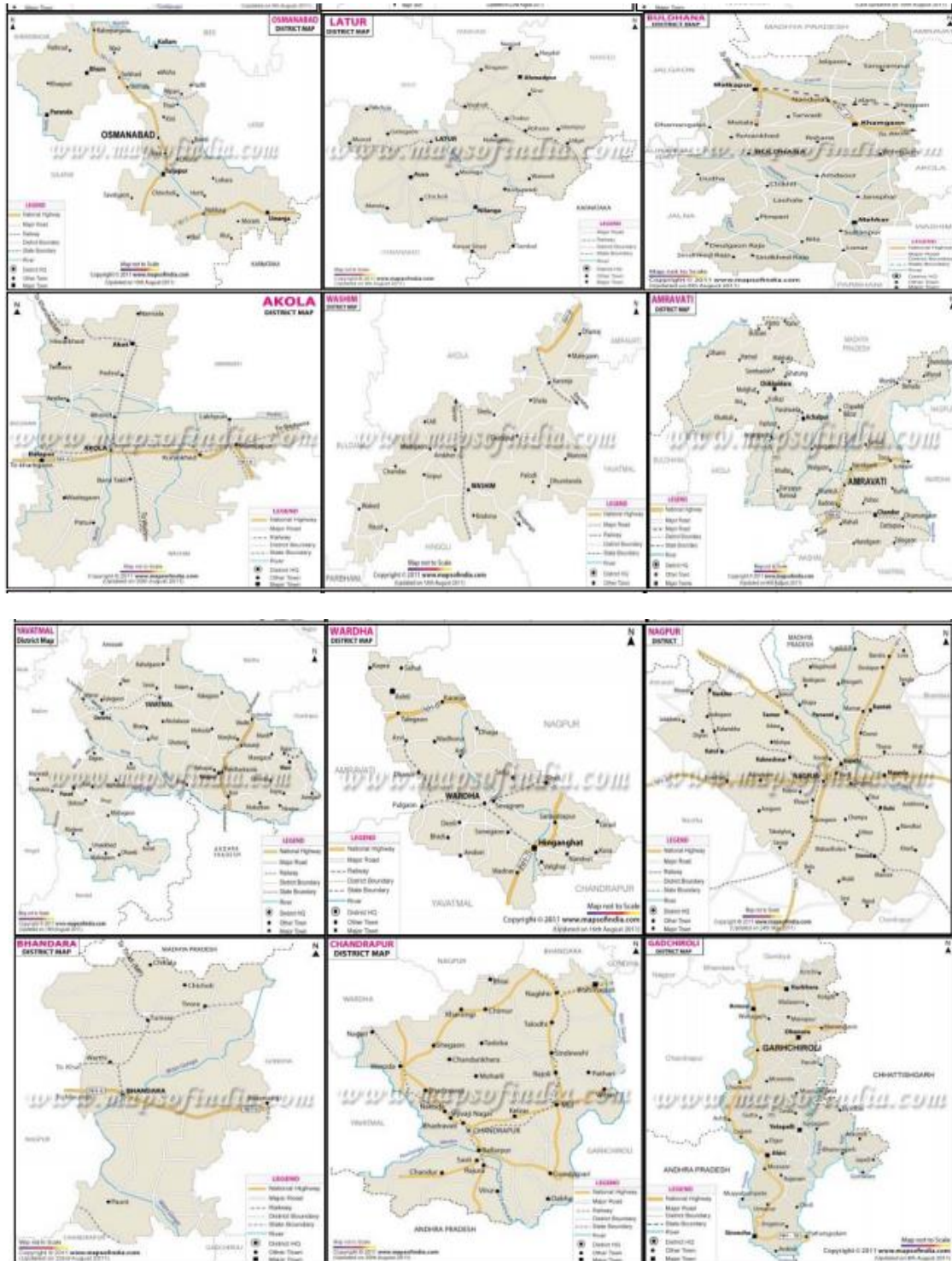
	Jalna	19.10 - 21.30 °N	75.40 - 76.40 °E
	Parbhani	18.45 - 20.10 °N	76.13 - 77.39 °E
	Hingoli	19.43 °N	77.11 °E
	Beed	18.30 - 19.30 °N	74.50 - 76.60 °E
	Nanded	18.25 - 19.91 °N	77.00 - 78.41 °E
	Osmanabad	17.35 - 18.40 °N	75.16 - 76.40 °E
	Latur	17.75 - 18.75 °N	76.25 - 77.25 °E
Amravati	Buldhana	19.85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





Maps of Districts:







Aurangabad			Jalna		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Ashrafpur	Aurangabad	1	Hiswan Bk.	Jalna
2	Aurangpur	Aurangabad	2	Hiswan Kh.	Jalna
3	Bagtalab	Aurangabad	3	Hiwara Roshangaon	Jalna
4	Bakapur	Aurangabad	4	Hiwardi	Jalna
5	Balapur	Aurangabad	5	Indewadi	Jalna
6	Bangaon	Aurangabad	6	Islamwadi	Jalna
7	Bebalyachiwadi	Aurangabad	7	Jaitapur	Jalna
8	Bendewadi	Aurangabad	8	Jalgaon	Jalna
9	Bhabarda	Aurangabad	9	Jamwadi	Jalna
10	Bhalgaon	Aurangabad	10	Kacharewadi	Jalna
11	Bhikapur	Aurangabad	11	Kadwanchi	Jalna
12	Bhindaon	Aurangabad	12	Kailasnagar	Jalna
13	Bhogalwadi	Aurangabad	13	Kakda	Jalna
14	Borwadi	Aurangabad	14	Karla	Jalna
15	Borwadi Tanda	Aurangabad	15	Kautha	Jalna
16	Chartha	Aurangabad	16	Khambewadi	Jalna
17	Chauka	Aurangabad	17	Khanepuri	Jalna
18	Chaukawadi	Aurangabad	18	Kharpudi	Jalna
19	Chincholi	Aurangabad	19	Khodepuri	Jalna
20	Anad	Sillod	20	Kolwadi	Jalna
21	Andhari	Sillod	21	Kumbephal Bk.	Jalna
22	Anvi	Sillod	22	Kumbhephal Shindkhed	Jalna
23	Asadi	Sillod	23	Londhyachiwadi	Jalna
24	Babhulgaon Bk.	Sillod	24	Majarewadi	Jalna
25	Bahuli	Sillod	25	Malegaon Kh.	Jalna
			26	Mali Pimpalgaon	Jalna
			27	Malshendra	Jalna
			28	Mamdabad	Jalna
			29	Manegaon Jahangir	Jalna
			30	Manegaon Khalsa	Jalna
			31	Maujpuri	Jalna
			32	Mohadi	Jalna
			33	Motigavhan	Jalna
			34	Nagapur	Jalna
			35	Nandapur	Jalna
			36	Nasadgaon	Jalna
			37	Navha	Jalna
			38	Ner	Jalna
			39	Nidhona	Jalna

Aurangabad			Jalna		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
			40	Nipani Pokhari	Jalna
			41	Nirkheda	Jalna

Parbhani			Hingoli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Adgaon	Palam	1	Ajalsonda	Aundha (Nagnath)
2	Ajamabad	Palam	2	Amdari	Aundha (Nagnath)
3	Anandwadi	Palam	3	Anjanwada	Aundha (Nagnath)
4	Anjanwadi	Palam	4	Anjanwada Tanda	Aundha (Nagnath)
5	Arkhed	Palam	5	Anjanwadi	Aundha (Nagnath)
6	Bandarwadi	Palam	6	Ankhali	Aundha (Nagnath)
7	Banwas	Palam	7	Asola Traf Aundha	Aundha (Nagnath)
8	Barbadi	Palam	8	Asola traf lakh	Aundha (Nagnath)
9	Bhalkudki	Palam	9	Asonda	Aundha (Nagnath)
10	Bhogaon	Palam	10	Aundha Nagnath	Aundha (Nagnath)
11	Borgaon Bk.	Palam	11	Berula	Aundha (Nagnath)
12	Borgaon Kh	Palam	12	Bhagwa	Aundha (Nagnath)
13	Chatori	Palam	13	Bhosi	Aundha (Nagnath)
14	Chorwad	Palam	14	Borja	Aundha (Nagnath)
15	Dhanewadi	Palam	15	Bramhanwada	Aundha (Nagnath)
16	Digras	Palam	16	Chimegaon	Aundha (Nagnath)
17	Dongargaon	Palam	17	Chincholi Nikoba	Aundha (Nagnath)
18	Dutka	Palam	18	Chondi Tarf Shahapur	Aundha (Nagnath)
19	Fattunaik Tanda	Palam	19	Daregaon	Aundha (Nagnath)
20	Ganeshwadi	Palam	20	Daudgaon	Aundha (Nagnath)
21	Ghoda	Palam	21	Devala	Aundha (Nagnath)
22	Girdharwadi	Palam	22	Dewala	Aundha (Nagnath)
23	Gulkhand	Palam	23	Dhar	Aundha (Nagnath)
24	Gunj	Palam	24	Dharkheda	Aundha (Nagnath)
25	Jawla	Palam	25	Dhegaj	Aundha (Nagnath)
26	Jogalgaon	Palam			
27	Kandalgaon	Palam			
28	Kapsi	Palam			
29	Khadi	Palam			
30	Kharab Dhanora	Palam			
31	Khoras	Palam			
32	Khurlewadi	Palam			
33	Kolwadi	Palam			
34	Konerwadi	Palam			
35	Landakwadi	Palam			
36	Mahadewadi	Palam			
37	Martandwadi	Palam			
38	Mozamabad	Palam			

Beed			Nanded		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Amalner	Patoda	1	Aloor	Dharmabad
2	Ambewadi	Patoda	2	Atala	Dharmabad

Beed			Nanded		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
3	Anpatwadi	Patoda	3	Atkur	Dharmabad
4	Antapur	Patoda	4	Babhali	Dharmabad
5	Bedarwadi	Patoda	5	Babhulgaon	Dharmabad
6	Bedarwadi	Patoda	6	Bachegaon	Dharmabad
7	Bedukwadi	Patoda	7	Bamni	Dharmabad
8	Belewadi	Patoda	8	Bannali	Dharmabad
9	Bensur	Patoda	9	Belgulari	Dharmabad
10	Bhaktache Gothe	Patoda	10	Belur Bk.	Dharmabad
11	Bhatewadi	Patoda	11	Belur Kh.	Dharmabad
12	Bhurewadi	Patoda	12	Chikna	Dharmabad
13	Bhusanarwadi	Patoda	13	Chincholi	Dharmabad
14	Bhyala	Patoda	14	Cholakha	Dharmabad
15	Chanderwadi	Patoda	15	Chondi	Dharmabad
16	Chikhali	Patoda	16	Dhanora Kh.	Dharmabad
17	Chincholi	Patoda	17	Digras	Dharmabad
18	Chumbli	Patoda	18	Elegaon	Dharmabad
19	Dagachiwadi	Patoda	19	Haregaon	Dharmabad
20	Daskhed	Patoda	20	Hasnali	Dharmabad
21	Daulatwadi	Patoda	21	Jaflapur	Dharmabad
22	Dhalewadi	Patoda	22	Jarikot	Dharmabad
23	Dhangar Jaulka	Patoda	23	Junni	Dharmabad
24	Dhoparwadi	Patoda	24	Karegaon	Dharmabad
25	Domri	Patoda	25	Karkheli	Dharmabad
26	Dongerkinhi	Patoda	26	Mangnali	Dharmabad
27	Gandalwadi	Patoda	27	Manur	Dharmabad
28	Gandhanwadi	Patoda	28	Mashti	Dharmabad
29	Gandhanwadi	Patoda	29	Mokali	Dharmabad
30	Gawalwadi	Patoda			
31	Gayakwadwadi	Patoda			

Osmanabad			Latur		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Bavi	Washi	1	Akharwai	Latur
2	Bori	Washi	2	Akoli	Latur
3	Brahmagaon	Washi	3	Babhulgaon	Latur
4	Dahiphal	Washi	4	Bamni	Latur
5	Dasmegaon	Washi	5	Baswantpur	Latur
6	Dongrewadi	Washi	6	Bhadgaon	Latur
7	Fakarabad	Washi	7	Bhadi	Latur
8	Ghatpimpri	Washi	8	Bhatangali	Latur
9	Ghodki	Washi	9	Bhatkheda	Latur
10	Gojwada	Washi	10	Bhosa	Latur
11	Golegaon	Washi	11	Bhoyara	Latur
12	Hatola	Washi	12	Bhuisamudraga	Latur
13	Indapur	Washi	13	Bindgihal	Latur
14	Isrup	Washi	14	Bodkha	Latur
15	Izora	Washi	15	Bokangaon	Latur
16	Jankapur	Washi	16	Bopala	Latur
17	Jawalka	Washi	17	Borgaon Bk.	Latur
18	Jeba	Washi	18	Bori	Latur

Osmanabad			Latur		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
19	Kadakhnathwadi	Washi	19	Borwadi	Latur
20	Kanheri	Washi	20	Chandeshwar	Latur
21	Kawadewadi	Washi			
22	Kelewadi	Washi			
23	Khamkarwadi	Washi			
24	Khanapur	Washi			
25	Lakhangaon	Washi			
26	Lonkhas	Washi			
27	Mahaldarpuri	Washi			
28	Mandva	Washi			
29	Masobachiwadi	Washi			
30	Nandgaon	Washi			
31	Pangri	Washi			
32	Para	Washi			
33	Pardi	Washi			
34	Pargaon	Washi			

Buldhana			Akola		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Alampur	Nandura	1	Barshi Takali	Barshitakli
2	Amboda	Nandura	2	Bhambora	Barshitakli
3	Aurangapur	Nandura	3	Bhendgaon	Barshitakli
4	Avdha Bk.	Nandura	4	Bhendi Kaji	Barshitakli
5	Avdha Kh.	Nandura	5	Bhendi Mahala	Barshitakli
6	Barafgaon	Nandura	6	Bhendi Sutrak	Barshitakli
7	Belad Pr.Jalgaon	Nandura	7	Bormali	Barshitakli
8	Belura	Nandura	8	Chelaka	Barshitakli
9	Bhiltvadi	Nandura	9	Chinchkhed	Barshitakli
10	Bhogalwadi	Nandura	10	Chinchkhed Bk.	Barshitakli
11	Bhorwand	Nandura	11	Chincholi Devdari	Barshitakli
12	Bhota	Nandura	12	Chincholi Rudrayani	Barshitakli
13	Bhuising	Nandura	13	Chohagaon	Barshitakli
14	Burti Pr.Chandur	Nandura	14	Dagadparwa	Barshitakli
15	Burti Pr.Wadner	Nandura	15	Davdari	Barshitakli
16	Chandur Biswa	Nandura	16	Dhaba	Barshitakli
17	Dadgaon	Nandura	17	Dhakali	Barshitakli
18	Dahigaon	Nandura			
19	Dahivadi	Nandura			
20	Dhadi	Nandura			
21	Dhanora Bk.	Nandura			
22	Dhanora Kh.	Nandura			
23	Dhanora Pr.Chandur	Nandura			

Washim			Amravati		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Ajgaon	Mangrulpir	1	Kaudanyapur	Teosa
2	Ambapur	Mangrulpir	2	Kawadgavhan	Teosa
3	Amgavhan	Mangrulpir	3	Kurha	Teosa
4	Arak	Mangrulpir	4	Maldhur	Teosa

Washim			Amravati		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
5	Asegaon	Mangrulpir	5	Malegaon	Teosa
6	Baldeo	Mangrulpir	6	Mamdapur	Teosa
7	Belkhed	Mangrulpir	7	Marda	Teosa
8	Bhadkumbha	Mangrulpir	8	Mardi	Teosa
9	Bhur	Mangrulpir	9	Masadi	Teosa
10	Bitoda	Mangrulpir	10	Mozari	Teosa
11	Borwha bk.	Mangrulpir	11	Murtijapur	Teosa
12	Borwha kh.	Mangrulpir	12	Nimbhora Delwadi	Teosa
13	Chakwa	Mangrulpir	13	Palwadi	Teosa
14	Chambhai	Mangrulpir	14	Raghunathpur	Teosa
15	Chandhai	Mangrulpir	15	Salora Bk.	Teosa
16	Chehel	Mangrulpir	16	Sarsi	Teosa
17	Chikhalgad	Mangrulpir	17	Satargaon	Teosa
18	Chikhali	Mangrulpir	18	Shendola Bk.	Teosa
19	Chinchakhed	Mangrulpir	19	Shendola Kh.	Teosa
20	Chinchala	Mangrulpir	20	Shendurjana Bk.	Teosa
21	Chincholi	Mangrulpir	21	Shendurjana Kh	Teosa
22	Chorad	Mangrulpir	22	Shidwadi	Teosa
23	Dabha	Mangrulpir	23	Shirajgaon Mozari	Teosa
24	Dabhadi	Mangrulpir	24	Shiwangaon	Teosa
25	Dastapur	Mangrulpir	25	Sultanpur	Teosa
26	Dhanora bk.	Mangrulpir	26	Surwadi Bk.	Teosa
27	Dhanora kh.	Mangrulpir	27	Surwadi Kh.	Teosa
28	Dhotra	Mangrulpir	28	Talegaon Thakur	Teosa
29	Ekamba	Mangrulpir	29	Tarkhed	Teosa
30	Falegaon	Mangrulpir	30	Taroda	Teosa
			31	Teosa	Teosa
			32	Thanathuni	Teosa
			33	Umarkhed	Teosa
			34	Virgavhan	Teosa
			35	Wadhona	Teosa
			36	Wandali	Teosa
			37	Wani	Teosa
			38	Warha	Teosa
			39	Warkhed	Teosa
			40	Waruda	Teosa
			41	Wathoda Kh	Teosa

Yavatmal			Wardha		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Amani Bk.	Mahagaon	1	Dharti	Karanja
2	Amani Kh.	Mahagaon	2	Dhawadi Bk	Karanja
3	Amboda	Mahagaon	3	Dhawadi Kh	Karanja
4	Anandnagar	Mahagaon	4	Dhawasa	Karanja
5	Anantwadi	Mahagaon	5	Dhawasa Bk	Karanja
6	Babasaheb Nagar	Mahagaon	6	Ekamba	Karanja
7	Beldari	Mahagaon	7	Kakaddara	Ashti
8	Bhamb	Mahagaon	8	Kakaddara	Ashti
9	Bhosa	Mahagaon	9	Khadaka	Ashti
10	Bijora	Mahagaon	10	Khadki	Ashti

Yavatmal			Wardha		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
11	Bondhara	Mahagaon	11	Khambit	Ashti
12	Bori	Mahagaon	12	Kinhala	Ashti
13	Botha	Mahagaon	13	Kolhakali	Ashti
14	Brahmi	Mahagaon	14	Lahan Arvi	Ashti
15	Chilgavhan	Mahagaon	15	Lakhanwada	Ashti
16	Chilli Ijara	Mahagaon	16	Lingapur	Ashti
17	Chincholi	Mahagaon	17	Mamdapur	Ashti
18	Chinchpad	Mahagaon	18	Manik Nagar	Ashti
19	Dagad Thar	Mahagaon	19	Manikwada	Ashti
20	Dahisawali	Mahagaon	20	Milanpur	Ashti
21	Dahiwad Kh.	Mahagaon	21	Moi	Ashti
22	Dhanoda	Mahagaon	22	Mubarakpur	Ashti
23	Dharegaon	Mahagaon	23	Nababpur	Ashti
24	Dharkanha	Mahagaon	24	Narsapur	Ashti
25	Dharmoha	Mahagaon	25	Narsingpur	Ashti
26	Dongargaon	Mahagaon	26	Navin Antora	Ashti
27	Fulsawangi	Mahagaon	27	Navin Ashti	Ashti
28	Fulsing Nagar	Mahagaon	28	Navin Kakaddara	Ashti
29	Gaul	Mahagaon	29	Navin Ramdara	Ashti
30	Ghanmukh	Mahagaon	30	Panchala	Ashti
31	Ghonsara	Mahagaon	31	Pandhurna	Ashti
32	Gunj	Mahagaon	32	Parsoda	Ashti
33	Hingani	Mahagaon	33	Peth	Ashti
34	Hiwalani	Mahagaon	34	Peth Ahmadpur	Ashti
35	Hiwara	Mahagaon	35	Pilapur	Ashti
36	Hiwardari	Mahagaon	36	Porgavhan	Ashti
37	Hiwari	Mahagaon	37	Ramdara	Ashti
38	Ijani	Mahagaon	38	Ranwadi	Ashti
39	Januna	Mahagaon	39	Rasulpur	Ashti
40	Kalgaon	Mahagaon	40	Sahur	Ashti
41	Kali	Mahagaon			
42	Kali	Mahagaon			
43	Kalulalnagar	Mahagaon			
44	Kanha	Mahagaon			
45	Karanji	Mahagaon			
46	Karanjkhed	Mahagaon			
47	Kasarbehel	Mahagaon			
48	Kasola	Mahagaon			
49	Katarwadi	Mahagaon			
50	Kaudgaon	Mahagaon			
51	Kaurwadi	Mahagaon			
52	Kaurwadi	Mahagaon			
53	Kawatha Jahagir	Mahagaon			
54	Khadaka	Mahagaon			
55	Khamalwadi	Mahagaon			
56	Kondari	Mahagaon			
57	Kothari	Mahagaon			
58	Leva	Mahagaon			
59	Lohara Kh.	Mahagaon			
60	Mahagaon	Mahagaon			
61	Malegaon	Mahagaon			

Yavatmal			Wardha		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
62	Malkapur	Mahagaon			
63	Malkinhi	Mahagaon			
64	Malvakad	Mahagaon			
65	Manoharnagar	Mahagaon			
66	Mohadi	Mahagaon			
67	Morath Jahagir	Mahagaon			
68	Morwadi	Mahagaon			
69	Mudana	Mahagaon			
70	Nagarwadi	Mahagaon			
71	Naiknagar	Mahagaon			
72	Nandgavhan	Mahagaon			

Nagpur			Bhandara		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Adyal	Bhiwapur	1	Alesur	Lakhani
2	Alesur	Bhiwapur	2	Bhugaon	Lakhani
3	Bellarpar	Bhiwapur	3	Borgaon	Lakhani
4	Besur	Bhiwapur	4	Channa	Lakhani
5	Bhagebori	Bhiwapur	5	Chichtola	Lakhani
6	Bhagwanpur	Bhiwapur	6	Chikhalbodi	Lakhani
7	Bhivi	Bhiwapur	7	Daitmangli	Lakhani
8	Bhiwapur	Bhiwapur	8	Deori	Lakhani
9	Bhowari	Bhiwapur	9	Dhabetekari	Lakhani
10	Bordkala	Bhiwapur	10	Dhanala	Lakhani
11	Borgaon	Bhiwapur	11	Dhwarkheda	Lakhani
12	Botezari	Bhiwapur	12	Dighori	Lakhani
13	Chargaon	Bhiwapur	13	Dongargaon	Lakhani
14	Chargaon	Bhiwapur	14	Dongargaon	Lakhani
15	Chichala	Bhiwapur	15	Gadegaon	Lakhani
16	Chikhalapar	Bhiwapur	16	Gadpendhari	Lakhani
17	Chikhali	Bhiwapur	17	Garada	Lakhani
18	Chorvihara	Bhiwapur	18	Ghodezari	Lakhani
19	Dhamangaon	Bhiwapur	19	Gondegaon	Lakhani
20	Dhamangaon	Bhiwapur	20	Gondi	Lakhani
21	Dhaparla	Bhiwapur	21	Gondsawari	Lakhani
22	Dhaparla	Bhiwapur	22	Gurdha	Lakhani
23	Dongargaon	Bhiwapur	23	Isapur	Lakhani
24	Gadeghat	Bhiwapur	24	Jewanala	Lakhani
25	Gardapar	Bhiwapur	25	Kaneri	Lakhani
26	Gohodli	Bhiwapur	26	Kanhalgaon	Lakhani
27	Gondbori	Bhiwapur	27	Kawadsi	Lakhani
28	Hattibodi	Bhiwapur	28	Kawale Wada	Lakhani
29	Indapur	Bhiwapur	29	Kesalwada	Lakhani
30	Jambhurda	Bhiwapur	30	Kesalwada	Lakhani
31	Jaoli	Bhiwapur	31	Kesalwada	Lakhani
32	Jawrabodi	Bhiwapur	32	Khairi	Lakhani
33	Kaodasi	Bhiwapur	33	Khairi	Lakhani
34	Kargaon	Bhiwapur	34	Kharashi	Lakhani
35	Keslapar	Bhiwapur	35	Khaurshipar	Lakhani
36	Khairgaon	Bhiwapur	36	Khedepar	Lakhani

Nagpur			Bhandara		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
37	Khandalzari	Bhiwapur	37	Khunari	Lakhani
38	Khapari	Bhiwapur	38	Khurshipar	Lakhani
39	Kharkada	Bhiwapur	39	Kinhi	Lakhani
40	Khatkheda	Bhiwapur	40	Kolara	Lakhani
41	Kholdoda	Bhiwapur	41	Kolari	Lakhani
42	Kinhala	Bhiwapur			
43	Kinhikala	Bhiwapur			
44	Kinhikhurda	Bhiwapur			
45	Kitadi	Bhiwapur			
46	Kolari	Bhiwapur			
47	Lonara	Bhiwapur			
48	Mahalgaon	Bhiwapur			
49	Malewada	Bhiwapur			
50	Mandwa	Bhiwapur			
51	Mandwa	Bhiwapur			

Chandrapur			Gadchiroli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Adegaon	Gondpipri	1	Abapur	Chamorshi
2	Aksapur	Gondpipri	2	Adyal	Chamorshi
3	Arvi	Gondpipri	3	Alapalli Masahat	Chamorshi
4	Bhanar Heti	Gondpipri	4	Amboli	Chamorshi
5	Bhangarpeth	Gondpipri	5	Amgaon Chak No.1	Chamorshi
6	Bhangram Talodhi	Gondpipri	6	Amgaon Chak No.2	Chamorshi
7	Borgaon	Gondpipri	7	Amgaon Mahal	Chamorshi
8	Chak Bapur	Gondpipri	8	Anandgram	Chamorshi
9	Chak Beradi	Gondpipri	9	Anantpur	Chamorshi
10	Chak Borgaon	Gondpipri	10	Ankhoda	Chamorshi
11	Chak Darur	Gondpipri	11	Ashti Nokewada	Chamorshi
12	Chak Ghadoli	Gondpipri	12	Bahadupur	Chamorshi
13	Chak Gojoti	Gondpipri	13	Bamhanidev	Chamorshi
14	Chak Likhitwada	Gondpipri	14	Bamhanpeth	Chamorshi
15	Chak Nandgaon	Gondpipri	15	Bandhona	Chamorshi
16	Chak Navegaon	Gondpipri	16	Bawanchuwa	Chamorshi
17	Chak Pargaon	Gondpipri	17	Belgatta	Chamorshi
18	Chak Pellur	Gondpipri	18	Belgatta Chak	Chamorshi
19	Chak Pipari	Gondpipri	19	Bhadbhidi alias Bilaspur	Chamorshi
20	Chak Somanpalli	Gondpipri	20	Bhadbhidi Mokasa	Chamorshi
21	Chak Sukwasi	Gondpipri	21	Bhendala	Chamorshi
22	Chak Talodhi	Gondpipri	22	Bhendikanhar	Chamorshi
23	Chak Tarada	Gondpipri	23	Bhikshimal	Chamorshi
24	Chak Vithalwada	Gondpipri	24	Bhivapur	Chamorshi
25	Chiwandha	Gondpipri	25	Bhoganbodi	Chamorshi
26	Darur	Gondpipri	26	Chakalpeth	Chamorshi
27	Dhaba	Gondpipri	27	Chamorshi	Chamorshi
28	Dhamangaon	Gondpipri	28	Chandankhedi	Chamorshi
29	Dhamanpeth	Gondpipri	29	Chandankhedi	Chamorshi
30	Dhanapur	Gondpipri	30	Chandeshwar	Chamorshi
31	Dongargaon Mal	Gondpipri	31	Chapalwada	Chamorshi
32	Dubar Peth Chak	Gondpipri	32	Chapalwada Chak	Chamorshi

Chandrapur			Gadchiroli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
33	Fulora	Gondpipri	33	Chaparala	Chamorshi
34	Furdi Heti	Gondpipri	34	Chaudampalli	Chamorshi
35	Ganesh Pipari	Gondpipri	35	Chitekanhar	Chamorshi
36	Ganpur	Gondpipri	36	Chitranjanpur	Chamorshi
37	Ghadoli	Gondpipri	37	Darpanguda	Chamorshi
38	Gojoli Makta	Gondpipri	38	Dharmpur	Chamorshi
39	Gujari	Gondpipri	39	Dhekani	Chamorshi
40	Heti Nandgaon	Gondpipri	40	Dotkuli	Chamorshi
41	Hiwara	Gondpipri	41	Durgapur	Chamorshi
42	Kanhalgaon	Gondpipri	42	Ekodi	Chamorshi
43	Karanji	Gondpipri	43	Farada	Chamorshi
44	Kharal Peth	Gondpipri	44	Fokurdi	Chamorshi
45	Kirmiri	Gondpipri	45	Fuser	Chamorshi
46	Kondhana	Gondpipri	46	Gahubodi	Chamorshi
47	Korambi	Gondpipri	47	Gandhinagar	Chamorshi
48	Kudesavali	Gondpipri	48	Ganpur Raiyyatwari	Chamorshi
49	Kultha	Gondpipri	49	Gauripur	Chamorshi
50	Kunde Nandgaon	Gondpipri	50	Ghargaoon	Chamorshi
51	Lathi	Gondpipri	51	Ghot	Chamorshi
52	Mangal Peth	Gondpipri	52	Gilgaon	Chamorshi
53	Nandgaon	Gondpipri	53	Giripeth	Chamorshi
54	Nandwardhan	Gondpipri	54	Gundapalli	Chamorshi
55	Nawegaon Waghade	Gondpipri	55	Haladi	Chamorshi
56	Pachgaon	Gondpipri	56	Haladi Chak	Chamorshi
57	Panora	Gondpipri	57	Haladiwahi	Chamorshi
58	Pardi	Gondpipri	58	Haldawahi Tola	Chamorshi
59	Parsodi	Gondpipri	59	Hivergaon	Chamorshi
60	Sonapur Deshpande	Gondpipri	60	Illur	Chamorshi
61	Supgaon	Gondpipri	61	Jairampur	Chamorshi
62	Surgaon	Gondpipri	62	Jamgiri	Chamorshi
63	Tarda	Gondpipri	63	Janala Tukum	Chamorshi
64	Tarsa Bk.	Gondpipri	64	Jangam Kurul	Chamorshi
65	Tarsa Kh.	Gondpipri	65	Jawaharnagar	Chamorshi
66	Tohogaon	Gondpipri	66	Jaynagar	Chamorshi
			67	Jogana	Chamorshi
			68	Kadholi	Chamorshi
			69	Kalamgaon	Chamorshi
			70	Kanhalgaon	Chamorshi
			71	Kanholi	Chamorshi
			72	Kardel Tola	Chamorshi
			73	Karkapalli Mal	Chamorshi
			74	Khandala	Chamorshi
			75	Khorda Chak	Chamorshi
			76	Kishtapur	Chamorshi
			77	Konsari	Chamorshi
			78	Kothari	Chamorshi
			79	Krishnanagar	Chamorshi
			80	Kunghada Mal	Chamorshi
			81	Kunghada Raiyyatwari	Chamorshi
			82	Kurul	Chamorshi
			83	Kuthegaon	Chamorshi

Chandrapur			Gadchiroli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
			84	Lakhamapur Bori	Chamorshi
			85	Laxmanpur	Chamorshi
			86	Lenguda	Chamorshi
			87	Machhalighot	Chamorshi
			88	Made Amgaon	Chamorshi

Gondia		
Sr.	Name of the Village	Taluka
1	Girola	Salekasa
2	Gonditola	Salekasa
3	Gorre	Salekasa
4	Halbitola	Salekasa
5	Halbitola	Salekasa
6	Hititola	Salekasa
7	Isanatola	Salekasa
8	Jamakudo	Salekasa
9	Jambhadi	Salekasa
10	Kadhotitola	Salekasa
11	Kahali	Salekasa
12	Karutola	Salekasa
13	Kawarabandh	Salekasa
14	Khedepar	Salekasa
15	Kholgad	Salekasa
16	Kopalgad	Salekasa
17	Kosamtarra	Salekasa
18	Kotara	Salekasa
19	Kotjambhora	Salekasa
20	Kular Bhatti	Salekasa
21	Kumbhartola	Salekasa
22	Kunbitola	Salekasa
23	Labhan Dharni	Salekasa
24	Latori	Salekasa
25	Lohara	Salekasa
26	Makkatola	Salekasa
27	Managad	Salekasa
28	Maramjob	Salekasa
29	Marka Khanda	Salekasa
30	Mohatola	Salekasa
31	Mokasitola	Salekasa
32	Mundipar	Salekasa
33	Murkudoh	Salekasa
34	Nanwha	Salekasa
35	Navegaon	Salekasa
36	Nawatola	Salekasa
37	Nimba	Salekasa
38	Pandhari	Salekasa
39	Pandharwani	Salekasa
40	Pangaon	Salekasa
41	Paol Dawana	Salekasa
42	Pathantola	Salekasa

Gondia		
Sr.	Name of the Village	Taluka
43	Pathari	Salekasa
44	Pipariya	Salekasa
45	Powaritola	Salekasa
46	Ramatola	Salekasa
47	Rondha	Salekasa
48	Sakaritola	Salekasa
49	Sakharitola	Salekasa
50	Salaitola	Salekasa
51	Salangtola	Salekasa
52	Salekasa	Salekasa
53	Satgaon	Salekasa
54	Serpar	Salekasa
55	Sonartola	Salekasa
56	Sonpuri	Salekasa
57	Tirkhedi	Salekasa
58	Toyagondi	Salekasa
59	Vicharpur	Salekasa
60	Zaliya	Salekasa

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 04.0.0 Sectoral Scope: 03, EB 68.

1.9 Participation under other GHG Programs

Project has been registered with UNFCCC under Clean Development Mechanism program, Registration reference number 9444

The web link of the same is given below:

<https://cdm.unfccc.int/Projects/DB/RWTUV1356888981.65/view>

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 9444. 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 KumbharPura, 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 twelfth phase of the project activity which includes development of the CDM project for the cook stove distributed in, Raigad, Thane, Ratnagiri and Sindhudurg districts of Konkan division, Nashik, Dhule, Nandurbar, Jalgaon, and Ahmednagar districts of Nashik Division and Pune, Sangli, Satara, Solapur and Kolhapur districts of Pune Division in Maharashtra. The stakeholder's consultation was conducted on 2nd February 2012 at Pune the divisional

headquarters of Pune division and Nashik the divisional headquarters of Nashik Division and on 3rd February 2012 at Sangli the Adjacent districts for Konkan Division (since the Konkan Division headquarters is Mumbai, a Urban centre) covered the project locations and the consultations were also conducted before webhosting of the PDD.

The meetings were attended by members from various backgrounds as listed below – Participant of Nashik meeting –

Sl. No.	Name of Person	Designation
1	Palse Rina Mahavir	House-wife
2	Tambekar Sunita Suresh	House-wife
3	Londhe Sunita Ashok	House-wife
4	Suravse Rani Kalidas	House-wife
5	Kadam Ranjana Somanath	House-wife
6	Gaikwad Madakini Nanasaheb	House-wife
7	Gadekar Sunanda Uvraj	House-wife
8	Shinde Vijaya Bharat	House-wife
9	Pawar Sima Sandeep	House-wife
10	More Hanumanth Vijaya	House-wife
11	Rauth Sharda Asanthrao	House-wife
12	Savant Shantabai Navnath	House-wife
13	Dongre Sarasvati Shivaji	House-wife
14	Tingare Nilavati Kakasaheb	Working professional
15	Anand Ballu Chandve	Working professional
16	Prashant Kakasaheb Tingre	Working professional
17	Vijay Dagadu Lamakane	Working professional
18	Amol Tanaji Mule	Working professional
19	Shivaji Tanaji Chandane	Working professional
20	Mangesh Ballu Gharbude	Farmer
21	Sunil Devdas Bhandare	Farmer
22	Babalu Tanaji Chandane	Working professional
23	Anil Baburao Savant	Working professional
24	Mahadev Goroba Kamble	Working professional
25	Pravin Kaksahab Dingre	Working professional
26	Lokhande Saheb	Work's Manager, Vikram Stoves

Participant of Pune meeting –

Sl. No.	Name of Person	Designation
1	Baviskar Chandrakant Namdeo	Sr. Operator
2	Jitesh M Gavade	Working professional
3	Phatak Revati Vishwajit	Working professional
4	Vishwajit V Phatak	Working professional
5	Amit Namdev Davre	Farmer
6	Sachin Aadagle	Working professional

7	Vijay Budwale	Working professional
8	Akash Rajpurohit	Working professional
9	Sunny Chandane	Working professional
10	Abhijit Londhe	Farmer
11	Sagar Londhe	Businessman
12	Sandeep Randive	Working professional
13	Avinash Subash Jadav	Working professional
14	Dhavre Suhas Shivaji	Working professional
15	Gautam Dhani Binge	Working professional
16	Dilip Shah	Working professional
17	Gunaji Adagale	Farmer
18	Roshan Patel	Businessman
19	Jadhav Avinash Subhash	Student
20	B Rupesh Dalvi	Farmer
21	Shankar Patil	Working professional
22	Pankaj Baviskar	CTO, GKEMPL

Participant of Sangli meeting –

Sl. No.	Name of Person	Designation
1	Gulab Dagadu Sitape	Working professional
2	Shivraj Murlidhar Sathe	Working professional
3	Navnath Govind Ghodke	Working professional
4	Kodiba Sopan Shirmali	Working professional
5	Ranav Jyotiram Kanekore	Working professional
6	Shewale Mahadev Sadashiv	Student
7	Suraj Kashinath Naravre	Student
8	Balaji Vakonde	Local representative
9	Alere Samdhan Bhagirath	Student
10	Prakash Vilas Jadhav	Local representative
11	Anjali Giri	House-wife
12	Rupali Naliram Deshpande	House-wife
13	Viajinath Vishwanath Kamble	Local representative
14	Gayake Ashok Gyanba	Student
15	Shakruta Govind Kumbhar	Working professional
16	Savita Tukaram Yadav	House-wife
17	Shobha B Kamble	House-wife
18	Rina Vanraj Bansode	Working professional
19	Sunil Yenale	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 meetings of Nashik, Pune and Sangli are summarised as below –

Queries	Reply
The benefits the users of improved Cook stove are likely to receive from the project activity?	Addressing to the query the representative of M/s Vikram stoves explained on how the use of improved cook stoves for cooking will decrease the indoor air pollution; reduce cooking time and lower fuel-wood consumption due to higher efficiency. Moreover, the users of improved cook stoves will get free maintenance service and also free of cost replacement of the system at the end of its lifetime.
The activities that users have to perform under the project activity?	Addressing to the query the representative of M/s Vikram Stoves clarified that, users have to continue using the ICS for daily cooking purpose and cannot use traditional cook stove. He also described the monitoring plan and briefed the parameters to be monitored and procedure to be followed by the user.
The tenure of the benefit period was also enquired?	Addressing to the query the representative of M/s Vikram stoves clarified that, users considered under the project will receive free of cost maintenance service for 10 years post to registration.
Queries	Reply
How will the project contribute the pollution reduction?	The representative from GKEMPL explained that, project is reducing fire-wood consumption through improved combustion technology and thereby reducing green-house gases emission and also reducing smoke generation.
Timeline of CDM project development?	Responding to the query, Mr. Baviskar representative from GKEMPL mentioned that, time line for CDM project development and registration is around one year but, the revenue inflow will take at least another one year.
Process of estimation of green house gas emission?	In response to the query, Mr. Baviskar representative from GKEMPL explained the procedure of Green-house gas emission reduction calculation in brief.
Modalities that users of Improved Cook stove have to undertake for the successful receipt of CDM revenue and benefit to be received by them in return?	Addressing to the query Mr. Baviskar representative from GKEMPL described the monitoring plan and briefed the parameters to be monitored and procedure to be followed by the user. Further to this, the representative from Vikram Stoves clarified that, the users of Improved Cook stoves will get free maintenance service and also the Improved Cook stove system will be replaced with the new ICS system after end of the lifetime of first system.

Queries	Reply
Clarification on process of estimation of Green-house gas emission reduction?	In response to the query Mr. Yenale, representative of M/s Vikram Stoves explained the procedure of Green-house gas emission reduction calculation in brief
Tasks to be undertaken by the users of Improved Cook stove for availing benefit?	Addressing to the query Mr. Yenale described the monitoring plan, the parameters to be monitored and steps to undertake by the user. Further to this, the representative from Vikram Stoves clarified that, improved cook stove users will get free maintenance service and also free of cost replacement of the system at the end of its lifetime within the crediting period.
Tenure during which the user will get this benefit?	Responding to the query Mr. Saheb, representative of M/s Vikram Stoves replied that, ICS systems considered under the project will receive free of cost maintenance service for 10 years post to registration.

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

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))

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.

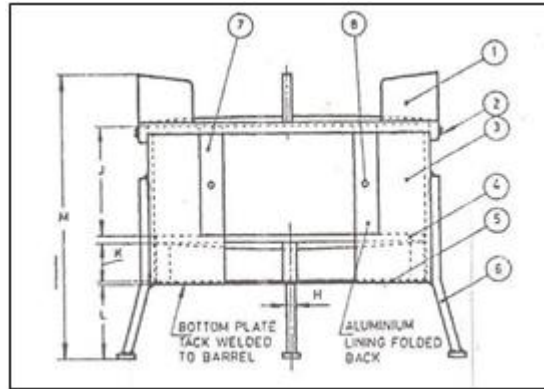
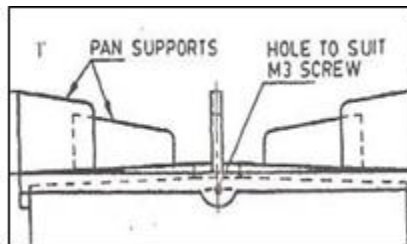
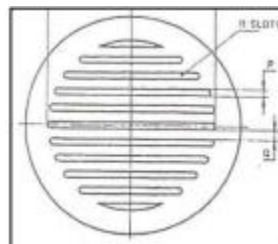


Diagram of Improved Cook Stove

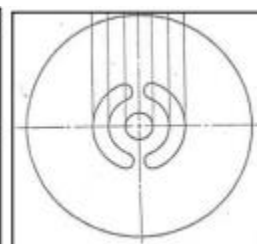
1. Top plate,
2. Screw,
3. Barrel,
4. Grate,
5. Bottom Plate,
6. Legs,
7. Aluminium Lining and
8. Rivet



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.
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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	$B_{y,\text{savings}}$
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	$B_{y,\text{savings}}$ is calculated using equation $B_{y,\text{savings}} = B_{\text{old}} * (1 - \eta_{\text{old}} / \eta_{\text{new}})$ $= 1.469 * (1 - 0.1 / 0.2988)$ $= 0.9774 \text{ tonne /household/year}$
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.
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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	$\text{Energy Saving} = B_{y, \text{ saving}} * \text{NCV}_{\text{biomass}}$ $= \text{Bold} * (1 - \eta_{\text{old}}/\eta_{\text{new}}) * \text{NCV}_{\text{biomass}}$ $= 1.469 * (1 - 0.1/0.2988) * 0.0150$ $= 0.01466 \text{ TJ /household /year}$ $= 0.00407 \text{ GWhth/household/year}$ $= 4.073 \text{ MWhth/ household/year}$ $= 1.358 \text{ MWhe / household/year}$ Note: Value of $\text{NCV}_{\text{biomass}}$ is considered as per Paragraph 5 of the applicable methodology AMS -II. G. Version 04.0; 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
	09-October-2012 to 08-October-2013	25-11-2013, 27-11-2013, 07-12-2013, 04-12-2013, 09-01-2014, 11-01-2014, 13-01-2014, 13-01-2014, 15-01-2014, 15-01-2014, 11-01-2014, 09-01-2014, 07-12-2013, 05-12-2013, 03-12-2013, 01-12-2013, 29-11-2013, 27-11-2013, 25-11-2013	40	29.04%
	09-October-2013 to 08-October-2014	09-01-2015, 27-11-2014, 07-12-2014, 04-12-2014, 25-11-2014, 11-01-2015, 13-01-2015, 13-01-2015, 15-01-2015, 15-01-2015, 11-01-2015, 09-01-2015, 25-11-2014, 27-11-2014, 29-11-2014, 01-12-2014, 03-12-2014, 05-12-2014, 07-12-2014	40	28.15%
	09-October-2014 to 08-October-2015	13-01-2016, 04-12-2015, 09-01-2016, 13-01-2016, 11-01-	40	28.04%

		2016, 07-12-2015, 25-11-2015, 27-11-2015, 11-01-2016, 15-01-2016, 09-01-2016, 15-01-2016, 07-12-2015, 03-12-2015, 01-12-2015, 05-12-2015, 29-11-2015, 27-11-2015, 25-11-2015		
	09-October-2015 to 08-October-2016	07-12-2016, 09-01-2017, 25-11-2016, 27-11-2016, 04-12-2017, 13-01-2017, 11-01-2017, 13-01-2017, 07-12-2016, 09-01-2017, 05-12-2016, 03-12-2016, 15-01-2017, 15-01-2017, 11-01-2017, 27-11-2016, 25-11-2016, 01-12-2016, 29-11-2016	40	27.01%
	09-October-2016 to 08-October-2017	25-11-2017, 11-01-2018, 13-01-2018, 03-12-2017, 01-12-2017, 29-11-2017, 27-11-2017, 25-11-2017, 07-12-2017, 05-12-2017, 13-01-2018, 27-11-2017, 07-12-2017, 03-12-2017, 09-01-2018, 15-01-2018, 15-01-2018, 11-01-2018, 09-01-2018	40	26.01%
Monitoring equipment	- Digital Thermometer - 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 = $(n-1) \times (W \times 0.214 + w) \times (t_2 - t_1) + (W \times 0.214 + w) \times (t_3 - t_1)$ kcal Heat Produced = $[(X \times c_1) + (x \times d / 1000 \times c_2)]$ kcal Thermal Efficiency = Heat utilised/ Heat Produced $\times 100$ Where <table border="1"> <tr> <td>w</td><td>Mass of water in vessel, in kg</td></tr> <tr> <td>W</td><td>Mass of the vessel complete with lead and stirrer, in kg</td></tr> <tr> <td>X</td><td>Mass of the fuel consumed, in kg</td></tr> <tr> <td>c₁</td><td>Calorific value of wood in kcal/kg</td></tr> <tr> <td>x</td><td>Volume of the kerosene consumed, in ml</td></tr> <tr> <td>c₂</td><td>Calorific value of kerosene in kcal/kg</td></tr> <tr> <td>d</td><td>Density of kerosene, in g/ml</td></tr> <tr> <td>t₁</td><td>Initial temperature of the water, in °C</td></tr> <tr> <td>t₂</td><td>Final temperature of the water, in °C</td></tr> <tr> <td>t₃</td><td>Final temperature of the water in the last vessel at the completion of the test, in °C</td></tr> <tr> <td>n</td><td>Total number of vessels used</td></tr> <tr> <td>0.214</td><td>Specific heat of aluminium in kcal/kg°C</td></tr> </table>	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 °C	t ₂	Final temperature of the water, in °C	t ₃	Final temperature of the water in the last vessel at the completion of the test, in °C	n	Total number of vessels used	0.214	Specific heat of aluminium in kcal/kg°C
w	Mass of water in vessel, in kg																								
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t ₃	Final temperature of the water in the last vessel at the completion of the test, in °C																								
n	Total number of vessels used																								
0.214	Specific heat of aluminium in kcal/kg°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 forty 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
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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. <table><tr><th>Period</th><th>No. of Dis-continued user</th><th>Date of Survey</th><th>Number of beneficiaries surveyed</th><th>% of partial users</th><th>% of users used ICS only</th></tr><tr><td>09-October-2012 to 08-October-2013</td><td>0</td><td>25-11-2013, 27-11-2013, 07-12-2013, 04-12-2013, 09-01-2014, 11-01-2014, 13-01-2014, 13-01-2014, 15-01-2014, 15-01-2014, 11-01-2014, 09-01-2014, 07-12-2013, 05-12-2013, 03-12-2013, 01-12-2013, 29-11-2013, 27-11-2013, 25-11-2013</td><td>160</td><td>3.13%</td><td>96.88%</td></tr><tr><td>09-October-2013 to 08-October-2014</td><td>0</td><td>09-01-2015, 27-11-2014, 07-12-2014, 04-12-2014, 25-11-2014, 11-01-2015, 13-01-2015, 13-01-2015,</td><td>160</td><td>6.25%</td><td>93.75%</td></tr></table>	Period	No. of Dis-continued user	Date of Survey	Number of beneficiaries surveyed	% of partial users	% of users used ICS only	09-October-2012 to 08-October-2013	0	25-11-2013, 27-11-2013, 07-12-2013, 04-12-2013, 09-01-2014, 11-01-2014, 13-01-2014, 13-01-2014, 15-01-2014, 15-01-2014, 11-01-2014, 09-01-2014, 07-12-2013, 05-12-2013, 03-12-2013, 01-12-2013, 29-11-2013, 27-11-2013, 25-11-2013	160	3.13%	96.88%	09-October-2013 to 08-October-2014	0	09-01-2015, 27-11-2014, 07-12-2014, 04-12-2014, 25-11-2014, 11-01-2015, 13-01-2015, 13-01-2015,	160	6.25%	93.75%
Period	No. of Dis-continued user	Date of Survey	Number of beneficiaries surveyed	% of partial users	% of users used ICS only														
09-October-2012 to 08-October-2013	0	25-11-2013, 27-11-2013, 07-12-2013, 04-12-2013, 09-01-2014, 11-01-2014, 13-01-2014, 13-01-2014, 15-01-2014, 15-01-2014, 11-01-2014, 09-01-2014, 07-12-2013, 05-12-2013, 03-12-2013, 01-12-2013, 29-11-2013, 27-11-2013, 25-11-2013	160	3.13%	96.88%														
09-October-2013 to 08-October-2014	0	09-01-2015, 27-11-2014, 07-12-2014, 04-12-2014, 25-11-2014, 11-01-2015, 13-01-2015, 13-01-2015,	160	6.25%	93.75%														

			15-01-2015, 15-01-2015, 11-01-2015, 09-01-2015, 25-11-2014, 27-11-2014, 29-11-2014, 01-12-2014, 03-12-2014, 05-12-2014, 07-12-2014			
	09-October-2014 to 08-October-2015	0	13-01-2016, 04-12-2015, 09-01-2016, 13-01-2016, 11-01-2016, 07-12-2015, 25-11-2015, 27-11-2015, 11-01-2016, 15-01-2016, 09-01-2016, 15-01-2016, 07-12-2015, 03-12-2015, 01-12-2015, 05-12-2015, 29-11-2015, 27-11-2015, 25-11-2015	160	8.75%	91.25%
	09-October-2015 to 08-October-2016	0	07-12-2016, 09-01-2017, 25-11-2016, 27-11-2016, 04-12-2017, 13-01-2017, 11-01-2017, 13-01-2017, 07-12-2016, 09-01-2017, 05-12-2016, 03-12-2016, 15-01-2017, 15-01-2017, 11-01-2017, 27-11-2016, 25-11-2016, 01-12-2016, 29-11-2016	160	9.38%	90.63%
	09-October-2016 to 08-October-2017	0	25-11-2017, 11-01-2018, 13-01-2018, 03-12-2017, 01-12-2017, 29-11-2017, 27-11-2017, 25-11-2017, 07-12-2017, 05-12-2017, 13-01-2018, 27-11-2017, 07-12-2017, 03-12-2017, 09-01-2018, 15-01-2018, 15-01-2018, 11-01-2018, 09-01-2018	160	12.50%	87.50%

	Number of Improved Cook stoves distributed – 14,100
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	$\frac{\text{Share of beneficiaries using Improved cookstoves}}{160} = \frac{160 - \text{no of partial users}}{160}$
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	Period	Total number of beneficiaries	Number of beneficiaries for which defunct date was a day/more	Average days of operation
	09-October-2012 to 08-October-2013	14,100	0	365
	09-October-2013 to 08-October-2014	14,100	0	365
	09-October-2014 to 08-October-2015	14,100	0	365
	09-October-2015 to 08-October-2016	14,100	0	365
	09-October-2016 to 08-October-2017	14,100	0	365
Monitoring equipment	-			
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	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 - $= (365 - \text{Average number of days of traditional cook stove usage in all households}) / 365$

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 distributed and under operation	Number of cookstoves replaced post end of life time	Number of cookstoves replaced due to defunct
	09-October-2012 to 08-October-2013	14,100	0	0
	09-October-2013 to 08-October-2014	14,100	0	0
	09-October-2014 to 08-October-2015	14,100	0	0
	09-October-2015 to 08-October-2016	14,100	0	0
	09-October-2016 to 08-October-2017	14,100	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.			

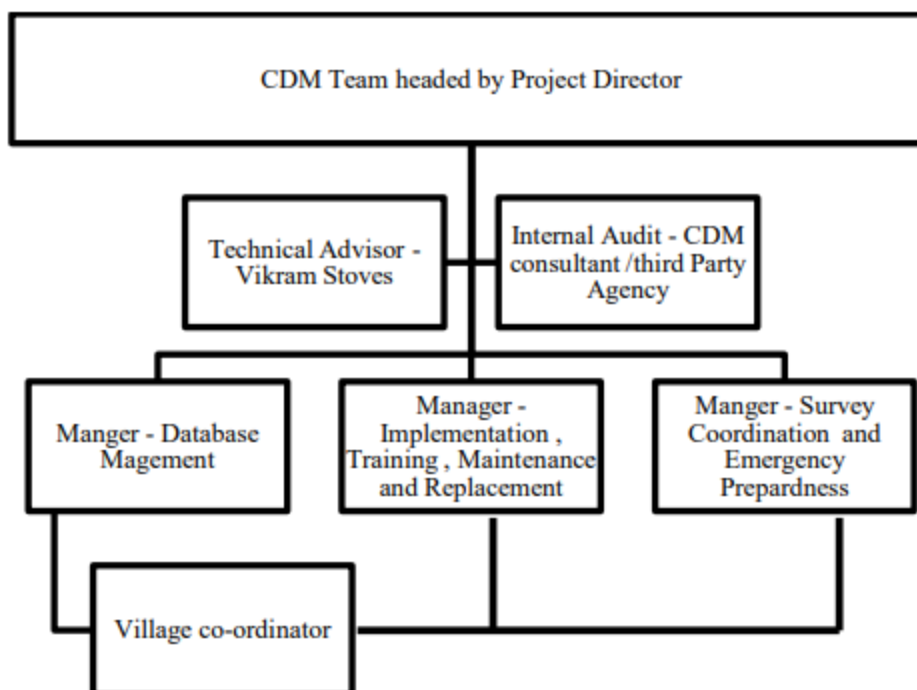
Data / Parameter	By, savings
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Data unit	Tonnes/year/household		
Description	Quantity of woody biomass that is saved through the project activity.		
Source of data	calculated		
Description of measurement methods and procedures to be applied	The quantity of woody biomass saved is calculated following the equation $B_{y, \text{ saving}} = B_{\text{old}} * (1 - \eta_{\text{old}}/\eta_{\text{new}})$ 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
	09-October-2012 to 08-October-2013	29.04%	0.9632
	09-October-2013 to 08-October-2014	28.15%	0.9472
	09-October-2014 to 08-October-2015	28.04%	0.9450
	09-October-2015 to 08-October-2016	27.01%	0.9251
	09-October-2016 to 08-October-2017	26.01%	0.9043
Monitoring equipment	-		
QA/QC procedures to be applied	The minimum tested efficiency of the representative samples or 29.88% is used for η_{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 (η_{new}). 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 stoves¹⁴. 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.

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.

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 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:

$$= (365 - \text{Average No. of days of traditional cook stoves usage in all households}) / 365$$

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 14,100.

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 –

$$n \geq 1.645^2 N * p * (1-p) / ((N-1) * 0.1^2 * p^2 + 1.645^2 * p * (1-p))$$

Where,

N	=	Sample size
N	=	14,100
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, $n \geq 31$

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
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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 $\pm 10\%$ 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/14,100, i.e., 160/14,100. p = proportion, 90%

q = (1-p)

n = number of cook stoves that are observed in the sample

Step 3: Estimating of Precision

Proportion= $\pm z$ 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 $\pm 10\%$ 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 $\pm 10\%$.

Training

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

Entity	Objective of training	Trained by	Onset	Frequency
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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:

ER_y - Emission reductions during the year y in tCO₂e

$B_{y,savings}$ - Quantity of woody biomass that is saved in tonnes

$f_{NRB,y}$ - Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (f_{NRB}) values available on the CDM website

$NCV_{biomass}$ - Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)

$EF_{projected_fossilfuel}$ - Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO₂/TJ⁴

$B_{y,savings}$ is estimated using one the following methods:

$$B_{y,savings} = B_{old} * (1 - n_{old}/n_{new})$$

Where:

B_{old} - Quantity of woody biomass used in the absence of the project activity in tonnes.

n_{old} - 1. Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is being replaced;

2. A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney; for other types of systems a default value of 0.2 may be optionally used.

n_{new} - Efficiency of the system being deployed as part of the project activity (fraction), as determined using the water boiling test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity

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 ₂ e/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 ₂ e /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 13,343 tCO₂e /year.

The Baseline Emissions achieved for this monitoring period is 62,745 tCO₂e /year. (Complete calculations are mentioned in Appendix – 1 of the monitoring report).

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 – 09-October-2012 to 08-October-2013			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-2250	Gajanan Waman Sanap	Hingoli	29.044%
GKEMPLPH-24-914	Laxmi Vasant Bhutekar	Jalna	29.101%
GKEMPLPH-24-5800	Ankush Vithoba Ghode	Akola	29.120%
GKEMPLPH-24-13236	Dnyandev Gajaba Fartade	Gondia	29.127%
GKEMPLPH-24-639	Subhas Damodhar Bhole	Jalna	29.149%
GKEMPLPH-24-4752	Arjun Kisan Balode	Latur	29.168%
GKEMPLPH-24-1594	Rangnath Chhaburao Abuj	Parbhani	29.175%
GKEMPLPH-24-7961	Bhagwan Ramkisan Barwal	Wardha	29.180%
GKEMPLPH-24-11672	Kesarbai Mahadu Kharat	Gadchiroli	29.204%
GKEMPLPH-24-3566	Anshiram Gyanuba Kalkumbe	Osmanabad	29.205%

Third party assessment for monitoring period – 09-October-2012 to 08-October-2013			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-5567	Laxman Baburao Matre	Akola	29.218%
GKEMPLPH-24-8321	Vishnu Trymbak Satpute	Wardha	29.227%
GKEMPLPH-24-2774	Suresh Laxman Dongare	Beed	29.227%
GKEMPLPH-24-11620	Raosaheb Fakirba Darade	Gadchiroli	29.236%
GKEMPLPH-24-11966	Sayyad Mukhtarali Jahedali	Gadchiroli	29.260%
GKEMPLPH-24-3051	Lilabai Pundalik Sahane	Nanded	29.286%
GKEMPLPH-24-6462	Abasaheb Asaram Kute	Amravati	29.330%
GKEMPLPH-24-7441	Sunil Balaji Gore	Yavatmal	29.346%
GKEMPLPH-24-7076	Drupadabai Narayan Shitole	Amravati	29.359%
GKEMPLPH-24-9659	Chammu Mangal Kumare	Bhandara	29.365%
GKEMPLPH-24-1712	Babarav Janravji Ade	Parbhani	29.372%
GKEMPLPH-24-12494	Santosh Narayan Kshirsagar	Gadchiroli	29.397%
GKEMPLPH-24-3488	Sanjiv Uttam Janjal	Osmanabad	29.430%
GKEMPLPH-24-5021	Narayan Bhaurav Jadhav	Buldhana	29.449%
GKEMPLPH-24-10005	Somnath Tukaram Mhaslekar	Chandrapur	29.450%
GKEMPLPH-24-13436	Rameshwar Baburao Thabde	Gondia	29.476%
GKEMPLPH-24-17	Yogesh Rameshwar Gore	Aurangabad	29.517%
GKEMPLPH-24-3641	Babanrao Govinda Kurhade	Latur	29.518%
GKEMPLPH-24-9076	Datta Sadashiv Bhumber	Nagpur	29.527%
GKEMPLPH-24-10847	Babasaheb Ramesh Lokhande	Gadchiroli	29.532%
GKEMPLPH-24-301	Shrikrushn Asaram Chavan	Aurangabad	29.535%
GKEMPLPH-24-2241	Gayabai Devsing Tayde	Hingoli	29.549%
GKEMPLPH-24-6077	Dnyaneshwar Ganeshrao Korde	Washim	29.563%
GKEMPLPH-24-9025	Narayan Sampat Telangre	Nagpur	29.578%
GKEMPLPH-24-11060	Aasaram Vamanrao Kawde	Gadchiroli	29.587%
GKEMPLPH-24-2461	Pravin Narayan Jagtap	Beed	29.590%
GKEMPLPH-24-10206	Rangnath Yeduba Bankar	Chandrapur	29.634%
GKEMPLPH-24-3226	Baburao Dhondiba Rathod	Nanded	29.646%
GKEMPLPH-24-5170	Shashikant Prabhakar Bade	Buldhana	29.651%
GKEMPLPH-24-4652	Manjulabai Sukhadev Sangale	Latur	29.691%

Third party assessment for monitoring period – 09-October-2013 to 08-October-2014			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-10719	Gayakwad Manakrnabai Pandurangji	Gadchiroli	28.151%
GKEMPLPH-24-1737	Babasaheb Narhari Ingole	Parbhani	28.340%
GKEMPLPH-24-11093	Jangali Somaji Yuvanate	Gadchiroli	28.389%
GKEMPLPH-24-725	Sindubai Narayan Banakar	Jalna	28.395%
GKEMPLPH-24-3319	Raghunath Kisan Lokhande	Osmanabad	28.405%
GKEMPLPH-24-2757	Prabhakar Baburao Ghogare	Beed	28.419%
GKEMPLPH-24-8878	Nirmla Shivaji Humbe	Nagpur	28.443%
GKEMPLPH-24-3438	Badam Chimaji Chavan	Osmanabad	28.486%
GKEMPLPH-24-6879	Sudhakar Balkrushna Dhole	Amravati	28.492%
GKEMPLPH-24-5316	Murgund Lila Rohidas	Akola	28.496%
GKEMPLPH-24-2298	Manohar Sheshrao Pande	Beed	28.509%
GKEMPLPH-24-2109	Kalyan Vishnu Garje	Hingoli	28.512%
GKEMPLPH-24-13511	Sominath Vishwanath Sanap	Gondia	28.521%
GKEMPLPH-24-3204	Subhash Trymbak Mhasalekar	Nanded	28.548%
GKEMPLPH-24-8225	Vishal Jagan Pattekar	Wardha	28.580%

Third party assessment for monitoring period – 09-October-2013 to 08-October-2014			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-8911	Manoharbuva Santosh Bhumber	Nagpur	28.581%
GKEMPLPH-24-6938	Mayuri Nana Jumbad	Amravati	28.643%
GKEMPLPH-24-5150	Kasturabai Himmatrao Gadekar	Buldhana	28.666%
GKEMPLPH-24-9828	Ganesh Kakaji Olekar	Chandrapur	28.666%
GKEMPLPH-24-2244	Tulshiram Kacharu Tidke	Hingoli	28.683%
GKEMPLPH-24-1549	Ashok Pundlikrao Parve	Parbhani	28.694%
GKEMPLPH-24-7228	Arjun Bhaurao Savne	Yavatmal	28.716%
GKEMPLPH-24-13669	Trimbak Lalsing Rathod	Gondia	28.717%
GKEMPLPH-24-3948	Askok Rasoji Kharat	Latur	28.722%
GKEMPLPH-24-361	Gokul Babu Yewle	Aurangabad	28.730%
GKEMPLPH-24-9315	Bhaskar Narayan Kalkumbe	Bhandara	28.733%
GKEMPLPH-24-5703	Chandrabhaga Dadarao Misal	Akola	28.745%
GKEMPLPH-24-13031	Swaminath Laxman Dhavle	Gadchiroli	28.748%
GKEMPLPH-24-12233	Babusing Munnasing Rajput	Gadchiroli	28.771%
GKEMPLPH-24-337	Lata Dinkar Aher	Aurangabad	28.776%
GKEMPLPH-24-10536	Baburao Kashinath Awale	Chandrapur	28.779%
GKEMPLPH-24-4724	Narayan Manikrao Pawar	Latur	28.793%
GKEMPLPH-24-12578	Rangnath Karbhari Kingare	Gadchiroli	28.800%
GKEMPLPH-24-11728	Babasaheb Santukrao Pacharane	Gadchiroli	28.812%
GKEMPLPH-24-4463	Sukhadev Tukaram Pawar	Latur	28.907%
GKEMPLPH-24-4938	Damodhar Bapurao Thombare	Buldhana	28.919%
GKEMPLPH-24-3202	Kailas Babasaheb Marade	Nanded	28.950%
GKEMPLPH-24-1487	Vijay Sukhdev Raut	Jalna	28.955%
GKEMPLPH-24-8265	Prabhakar Shivaji Pungle	Wardha	28.967%
GKEMPLPH-24-6444	Kamalbai Jijarao Dhawle	Washim	28.973%

Third party assessment for monitoring period – 09-October-2014 to 08-October-2015			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-11342	Kadubai Prakash Wagh	Gadchiroli	28.036%
GKEMPLPH-24-6551	Eaknath Kashirao Ingole	Amravati	28.045%
GKEMPLPH-24-3201	Indumala Baliram Shinde	Nanded	28.047%
GKEMPLPH-24-3297	Latabai Ram Ghodke	Nanded	28.056%
GKEMPLPH-24-291	Anna Laxman More	Aurangabad	28.068%
GKEMPLPH-24-3983	Satyam Manikrao Pawar	Latur	28.113%
GKEMPLPH-24-283	Sopan Niwruiti Kedar	Aurangabad	28.121%
GKEMPLPH-24-13570	Sandip Shivaji Khedkar	Gondia	28.127%
GKEMPLPH-24-11973	Yuvraj Babasaheb Dhakane	Gadchiroli	28.164%
GKEMPLPH-24-13843	Arjun Sampatrao Udhan	Gondia	28.168%
GKEMPLPH-24-12776	Yugam Jagdishrao Tarar	Gadchiroli	28.173%
GKEMPLPH-24-9588	Vijay Mahadev Parate	Bhandara	28.177%
GKEMPLPH-24-1722	Sadik Samad Abdul	Parbhani	28.180%
GKEMPLPH-24-5791	Parmeshwar Baliram Hatwate	Akola	28.185%
GKEMPLPH-24-7239	Baburao Ramdas Sarode	Yavatmal	28.189%
GKEMPLPH-24-1894	Kamalbai Mitthu Thosar	Hingoli	28.216%
GKEMPLPH-24-8104	Kushiwarta Eknath Pathade	Wardha	28.229%
GKEMPLPH-24-10219	Renuka Vishnu Taro	Chandrapur	28.234%
GKEMPLPH-24-3420	Kautikrao Rangnath Gaykwad	Osmanabad	28.244%
GKEMPLPH-24-5148	Dattu Sanpat Dongar	Buldhana	28.274%
GKEMPLPH-24-8569	Suresh Sukhdev Bhosle	Nagpur	28.286%
GKEMPLPH-24-8832	Sunil Ramesh Sable	Nagpur	28.299%

Third party assessment for monitoring period – 09-October-2014 to 08-October-2015			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-8199	Ashok Pandharinath Mane	Wardha	28.308%
GKEMPLPH-24-11591	Madhav Janardhan Pajge	Gadchiroli	28.358%
GKEMPLPH-24-4137	Sahebrav Shrirang Varagane	Latur	28.365%
GKEMPLPH-24-7005	Sima Krushna Kshirsagar	Amravati	28.402%
GKEMPLPH-24-5226	Ashwin Suresh Rao Khurpade	Buldhana	28.415%
GKEMPLPH-24-10708	Anil Haribhau Gavande	Gadchiroli	28.448%
GKEMPLPH-24-11113	Laxmibai Sakham Sultane	Gadchiroli	28.456%
GKEMPLPH-24-1463	Mira Bhausaheb Waghchaure	Jalna	28.509%
GKEMPLPH-24-2522	Shobhabai Wamanrao Mule	Beed	28.517%
GKEMPLPH-24-1412	Shabbir Kha Shikur Kha Pathan	Jalna	28.519%
GKEMPLPH-24-6352	Tukaram Pandit Gadegaar	Washim	28.610%
GKEMPLPH-24-4494	Vikaram Ambuji Darade	Latur	28.634%
GKEMPLPH-24-1651	Santosh Uttam Kanhere	Parbhani	28.641%
GKEMPLPH-24-9913	Babu Rustum Nagve	Chandrapur	28.668%
GKEMPLPH-24-5361	Shivajirao Yamundas Mule	Akola	28.687%
GKEMPLPH-24-1997	Dropadabai Trimbak Lad	Hingoli	28.796%
GKEMPLPH-24-3599	Gangaram Ashraji Shembade	Osmanabad	28.804%
GKEMPLPH-24-2950	Manohar Rameshwar Barande	Beed	28.831%

Third party assessment for monitoring period – 09-October-2015 to 08-October-2016			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-2866	Abedabi Dadu Pathan	Beed	27.009%
GKEMPLPH-24-2290	Aatmaram Natha Hiwale	Beed	27.056%
GKEMPLPH-24-4472	Dadarao Namdevrao Singare	Latur	27.058%
GKEMPLPH-24-139	Vimalbai Yashwanta Jogdande	Aurangabad	27.058%
GKEMPLPH-24-11960	Vijay Digambar Hivarkar	Gadchiroli	27.060%
GKEMPLPH-24-13804	Soma Kadma Bethekar	Gondia	27.099%
GKEMPLPH-24-1459	Ratnakalabai Narayan Shinde	Jalna	27.175%
GKEMPLPH-24-13361	Vachhal Gopalrao Wankhade	Gondia	27.230%
GKEMPLPH-24-2100	Pravin Radhakrishnan Puranik	Hingoli	27.245%
GKEMPLPH-24-3254	Vitthal Bhagawat Mahanor	Nanded	27.254%
GKEMPLPH-24-5066	Abasaheb Dattatray Deshmukh	Buldhana	27.284%
GKEMPLPH-24-11281	Sundarrav Marotray Karhale	Gadchiroli	27.320%
GKEMPLPH-24-8755	Fakirba Kondiba Vanarse	Nagpur	27.320%
GKEMPLPH-24-6200	Harshad Ramkisanrao Sangale	Washim	27.341%
GKEMPLPH-24-3217	Dnyaneshwar Kisanrao Nalvade	Nanded	27.348%
GKEMPLPH-24-10714	Gajanan Bapurao Bankar	Gadchiroli	27.357%
GKEMPLPH-24-239	Chitram Bhaiyya Jamunkar	Aurangabad	27.396%
GKEMPLPH-24-11272	Babasaheb Bajarang Vaidya	Gadchiroli	27.429%
GKEMPLPH-24-4873	Hanumantarao Kamlaji Kshirsagar	Buldhana	27.432%
GKEMPLPH-24-4780	Vijay Kautikrao Girnare	Latur	27.475%
GKEMPLPH-24-7243	Patilba Govinda Shevatre	Yavatmal	27.501%
GKEMPLPH-24-8395	Gajanan Karbhari Kshirsagar	Wardha	27.503%
GKEMPLPH-24-1573	Fakirchand Jivalal Kharule	Parbhani	27.511%
GKEMPLPH-24-6752	Rangnath Rustum Jadhav	Amravati	27.532%
GKEMPLPH-24-1610	Sudarshan Dadarao Singare	Parbhani	27.570%
GKEMPLPH-24-3508	Janabai Narayan Jadhav	Osmanabad	27.580%
GKEMPLPH-24-6778	Laxman Pundlik Bawskar	Amravati	27.629%
GKEMPLPH-24-5672	Ushabai Samadhan Jamunde	Akola	27.643%
GKEMPLPH-24-1497	Hirabai Harsingh Jagarwal	Jalna	27.715%

GKEMPLPH-24-9002	Shridhar Niranjana Ambhore	Nagpur	27.721%
GKEMPLPH-24-5489	Bhmrao Maroti Hiwale	Akola	27.734%
GKEMPLPH-24-2176	Gajanan Sitaram Gadekar	Hingoli	27.764%
GKEMPLPH-24-11522	Bhagirathibai Vishvnath Vairai	Gadchiroli	27.771%
GKEMPLPH-24-9298	Vikram Shankarrao Kadam	Bhandara	27.772%
GKEMPLPH-24-10035	Vikas Ramdas Kadam	Chandrapur	27.785%
GKEMPLPH-24-4457	Sahebrao Supdu Maher	Latur	27.800%
GKEMPLPH-24-11107	Raju Soma Rathod	Gadchiroli	27.803%
GKEMPLPH-24-3587	Gangaram Maroti Shinde	Osmanabad	27.836%
GKEMPLPH-24-7924	Keshav Punjaram Tayde	Wardha	27.869%
GKEMPLPH-24-10340	Suresh Bhanudas Sable	Chandrapur	27.930%

Third party assessment for monitoring period – 09-October-2016 to 08-October-2017			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-24-12036	Trimbak Vilas Garje	Gadchiroli	26.012%
GKEMPLPH-24-8785	Badrinath Sadashiv Kute	Nagpur	26.071%
GKEMPLPH-24-10381	Prabhakar Sahebarav Nagare	Chandrapur	26.155%
GKEMPLPH-24-2750	Dipak Amnbadas Jadhav	Beed	26.168%
GKEMPLPH-24-6166	Jagannath Mukindrao Shinde	Washim	26.219%
GKEMPLPH-24-3684	Kakasaheb Devrao Kanhere	Latur	26.224%
GKEMPLPH-24-6816	Tryambakrao Shesheraoji Dhote	Amravati	26.263%
GKEMPLPH-24-560	Pralhad Sadashiv Narode	Jalna	26.283%
GKEMPLPH-24-1664	Dasharath Baliram Aute	Parbhani	26.286%
GKEMPLPH-24-6657	Manikrao Bhagwan Susar	Amravati	26.291%
GKEMPLPH-24-13231	Malnbai Vitthal Pitale	Gondia	26.295%
GKEMPLPH-24-491	Suresh Babasaheb Yewale	Aurangabad	26.322%
GKEMPLPH-24-3356	Janardhan Ambadas Sormare	Osmanabad	26.339%
GKEMPLPH-24-12291	Mahadev Mhatarde Mahajan	Gadchiroli	26.355%
GKEMPLPH-24-3152	Narayan Kisan Talekar	Nanded	26.355%
GKEMPLPH-24-4947	Samadhan Uttam Chavhan	Buldhana	26.456%
GKEMPLPH-24-11814	Eknath Rambhau Ghuge	Gadchiroli	26.484%
GKEMPLPH-24-1616	Parmeshwar Namdev Jaybhaye	Parbhani	26.574%
GKEMPLPH-24-13131	Ashabai Hanumant Tavre	Gondia	26.600%
GKEMPLPH-24-1880	Mathurabai Ravan Pankhule	Hingoli	26.641%
GKEMPLPH-24-4916	Pravin Yashwant Jabhulkar	Buldhana	26.694%
GKEMPLPH-24-3878	Shenfad Baburao Pawar	Latur	26.729%
GKEMPLPH-24-11584	Pradip Jagannath Gavhale	Gadchiroli	26.737%
GKEMPLPH-24-12294	Sheshrao Tryambak Pungle	Gadchiroli	26.737%
GKEMPLPH-24-9516	Shashikala Haridas Salave	Bhandara	26.748%
GKEMPLPH-24-5620	Dinkarrao Pandurang Raut	Akola	26.812%
GKEMPLPH-24-648	Ambadas Balnath Yeole	Jalna	26.841%
GKEMPLPH-24-11665	Rameshwar Dadarao Palode	Gadchiroli	26.866%
GKEMPLPH-24-193	Shobha Dhanraj Sonone	Aurangabad	26.900%
GKEMPLPH-24-3357	Abhimanu Rangnathrao Raskar	Osmanabad	26.974%
GKEMPLPH-24-9727	Manohar Kashirao Shrirao	Chandrapur	27.006%
GKEMPLPH-24-3038	Tukaram Ashruba Parwe	Nanded	27.015%
GKEMPLPH-24-7461	Timkabai Shiva Shinde	Yavatmal	27.126%
GKEMPLPH-24-6001	Balaji Kundlik Dongre	Akola	27.135%
GKEMPLPH-24-7774	Kantabai Raghunath Durgule	Wardha	27.184%
GKEMPLPH-24-8748	Mangesh Keshav Raut	Nagpur	27.351%
GKEMPLPH-24-2221	Sukhram Sukh Savalkar	Hingoli	27.571%
GKEMPLPH-24-2640	Dnyaneshwar Bhikaji Darade	Beed	27.664%

GKEMPLPH-24-4491	Kaushlyabai Sakharam Wargane	Latur	27.776%
GKEMPLPH-24-8333	Udhдав Ranganath Jare	Wardha	27.911%

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 ₂ e /cook stove/ year
Leakage emission due to use of traditional cook stove usage (assuming 0 for ex-ante)	0	tCO ₂ e /cook stove/ year
Leakage emission, (LEy, per cook stove)	0.053	tCO ₂ e /cook stove/ year

Therefore, the total leakage emission (LEy) for the project activity assuming 90% of 14,100 Nos. cook stove distributed is 668 tCO₂e /year.

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of nonrenewable woody biomass used by the non-project households/users, that is attributable to the project activity, then B_{old} is adjusted to account for the quantified leakage. Alternatively, B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

The leakage emissions achieved for this monitoring period is 3,140 tCO₂e /year. (Complete calculations are mentioned in Appendix – 1 of the monitoring report).

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
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09-October-2012 to 08-October-2013	11,478	0	574	10,904
09-October-2013 to 08-October-2014	13,469	0	674	12,795
09-October-2014 to 08-October-2015	13,080	0	655	12,425
09-October-2015 to 08-October-2016	12,717	0	636	12,081
09-October-2016 to 08-October-2017	12,001	0	601	11,400
Total	62,745	0	3,140	59,605

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
09-October-2012 to 08-October-2017	59,605	63,375	-6.32%

Appendix-1

Baseline and leakage emission calculations for the period – 09-October-2012 to 08-October-2013

Parameters	Symbol	Data	Unit	Source
Number of Improved Cook stoves distributed		14,100	Nos.	PDD
Per capita woody biomass consumption		25.510	kg/ Month	Fixed Ex-ante
Number of family member		4.8	No./ Household	Fixed Ex-ante
Quantity of woody biomass used in absence of the project activity	B_{old}	1.469	Tonne /Year	Fixed Ex-ante
Efficiency of system being replaced	η_{old}	10%	%	Fixed Ex-ante
Efficiency of Improved cook stove	η_{new}	28.15%	%	Survey Findings
Quantity of woody biomass that is saved	$B_{y, savings}$	0.9472	Tonne /Year/ Household	Calculated
Fraction of woody biomass saved by the project activity in year y that can be established as non renewable biomass	$f_{NRB, y}$	87.9%		Fixed Ex-ante
Net calorific value of the non-renewable woody biomass that is substituted	$NCV_{biomass}$	0.015	TJ/ Tonne	Fixed Ex-ante
Emission factor for the substitution of non-renewable woody biomass by similar consumers.	$EF_{projected fossilfuel}$	81.600	tCO ₂ e /TJ	Fixed Ex-ante

Estimation of emission Reduction

Emission Reduction during the year y per cook stove without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA, per\ cook\ stove}$	1.0190	tCO ₂ e /Year /cook stove	Calculated
Actual Nos. of improved cook stove in operation		13,218	Nos.	Survey Findings
Emission Reduction for the project activity during the year y without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA}$	13,469	tCO ₂ e /Year	Calculated

Leakage emission

Accounting Leakage emission (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 B_{old} i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of B_{old} estimated by multiplying B_{old} by a net to gross adjustment factor of 0.95)		0.05095	tCO ₂ e /Year /cook stove	Calculated
Leakage factor for usage of traditional cook stoves		0		Calculated
Leakage emission per cook stove	$LE_{y, \text{ per cook stove}}$	0.051		Calculated
Leakage emission for the project activity in the year y	LE_y	674		

Baseline and leakage emission calculations for the period – 09-October-2013 to 08-October-2014

Parameters	Symbol	Data	Unit	Source
Number of Improved Cook stoves distributed		14,100	Nos.	PDD
Per capita woody biomass consumption		25.510	kg/ Month	Fixed Ex-ante
Number of family member		4.8	No./ Household	Fixed Ex-ante
Quantity of woody biomass used in absence of the project activity	B_{old}	1.469	Tonne /Year	Fixed Ex-ante
Efficiency of system being replaced	η_{old}	10%	%	Fixed Ex-ante
Efficiency of Improved cook stove	η_{new}	28.15%	%	Survey Findings
Quantity of woody biomass that is saved	$B_{y, \text{ savings}}$	0.9472	Tonne /Year/ Household	Calculated
Fraction of woody biomass saved by the project activity in year y that can be established as non renewable biomass	$f_{NRB, y}$	87.9%		Fixed Ex-ante
Net calorific value of the non-renewable woody biomass that is substituted	$NCV_{biomass}$	0.015	TJ/ Tonne	Fixed Ex-ante
Emission factor for the substitution of non-renewable woody biomass by similar consumers.	$EF_{\text{projected fossilfuel}}$	81.600	tCO ₂ e /TJ	Fixed Ex-ante

Estimation of emission Reduction

Emission Reduction during the year y per cook stove without gross adjustment factor for B_{old} to account for leakage	$ER_{y,WGA}$, per cook stove	1.0190	tCO ₂ e /Year /cook stove	Calculated
Actual Nos. of improved cook stove in operation		13,218	Nos.	Survey Findings
Emission Reduction for the project activity during the year y without gross adjustment factor for B_{old} to account for leakage	ER_y , WGA	13,469	tCO ₂ e /Year	Calculated

Leakage emission

Accounting Leakage emission (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 B_{old} i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of B_{old} estimated by multiplying B_{old} by a net to gross adjustment factor of 0.95)		0.05095	tCO ₂ e /Year /cook stove	Calculated
Leakage factor for usage of traditional cook stoves		0		Calculated
Leakage emission per cook stove	LE_y , per cook stove	0.051		Calculated
Leakage emission for the project activity in the year y	LE_y	674		

Baseline and leakage emission calculations for the period – 09-October-2014 to 08-October-2015

Parameters	Symbol	Data	Unit	Source
Number of Improved Cook stoves distributed		14,100	Nos.	PDD
Per capita woody biomass consumption		25.510	kg/ Month	Fixed Ex-ante
Number of family member		4.8	No./ Household	Fixed Ex-ante
Quantity of woody biomass used in absence of the project activity	B_{old}	1.469	Tonne /Year	Fixed Ex-ante
Efficiency of system being replaced	η_{old}	10%	%	Fixed Ex-ante
Efficiency of Improved cook stove	η_{new}	28.04%	%	Survey Findings
Quantity of woody biomass that is saved	B_y , savings	0.9450	Tonne /Year/ Household	Calculated
Fraction of woody biomass saved by the project activity in year y that can	$f_{NRB, y}$	87.9%		Fixed Ex-ante

be established as non renewable biomass				
Net calorific value of the non-renewable woody biomass that is substituted	NCV _{biomass}	0.015	TJ/ Tonne	Fixed Ex-ante
Emission factor for the substitution of non-renewable woody biomass by similar consumers.	EF _{projected fossilfuel}	81.600	tCO ₂ e /TJ	Fixed Ex-ante

Estimation of emission Reduction

Emission Reduction during the year y per cook stove without gross adjustment factor for B _{old} to account for leakage	ER _{y,WGA} , per cook stove	1.0167	tCO ₂ e /Year /cook stove	Calculated
Actual Nos. of improved cook stove in operation		12,866	Nos.	Survey Findings
Emission Reduction for the project activity during the year y without gross adjustment factor for B _{old} to account for leakage	ER _{y, WGA}	13,080	tCO ₂ e /Year	Calculated

Leakage emission

Accounting Leakage emission (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 B _{old} i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of B _{old} estimated by multiplying B _{old} by a net to gross adjustment factor of 0.95)		0.05084	tCO ₂ e /Year /cook stove	Calculated
Leakage factor for usage of traditional cook stoves		0		Calculated
Leakage emission per cook stove	LE _{y, per cook stove}	0.051		Calculated
Leakage emission for the project activity in the year y	LE _y	655		

Baseline and leakage emission calculations for the period – 09-October-2015 to 08-October-2016

Parameters	Symbol	Data	Unit	Source
Number of Improved Cook stoves distributed		14,100	Nos.	PDD
Per capita woody biomass consumption		25.510	kg/ Month	Fixed Ex-ante
Number of family member		4.8	No./ Household	Fixed Ex-ante

Quantity of woody biomass used in absence of the project activity	B_{old}	1.469	Tonne /Year	Fixed Ex-ante
Efficiency of system being replaced	η_{old}	10%	%	Fixed Ex-ante
Efficiency of Improved cook stove	η_{new}	27.01%	%	Survey Findings
Quantity of woody biomass that is saved	$B_{y, savings}$	0.9251	Tonne /Year/ Household	Calculated
Fraction of woody biomass saved by the project activity in year y that can be established as non renewable biomass	$f_{NRB, y}$	87.9%		Fixed Ex-ante
Net calorific value of the non-renewable woody biomass that is substituted	$NCV_{biomass}$	0.015	TJ/ Tonne	Fixed Ex-ante
Emission factor for the substitution of non-renewable woody biomass by similar consumers.	$EF_{projected fossilfuel}$	81.600	tCO ₂ e /TJ	Fixed Ex-ante

Estimation of emission Reduction

Emission Reduction during the year y per cook stove without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA, per cook stove}$	0.9953	tCO ₂ e /Year /cook stove	Calculated
Actual Nos. of improved cook stove in operation		12,778	Nos.	Survey Findings
Emission Reduction for the project activity during the year y without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA}$	12,717	tCO ₂ e /Year	Calculated

Leakage emission

Accounting Leakage emission (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 B_{old} i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of B_{old} estimated by multiplying B_{old} by a net to gross adjustment factor of 0.95)		0.04977	tCO ₂ e /Year /cook stove	Calculated
Leakage factor for usage of traditional cook stoves		0		Calculated
Leakage emission per cook stove	$LE_{y, per cook stove}$	0.050		Calculated
Leakage emission for the project activity in the year y	LE_y	636		

Baseline and leakage emission calculations for the period – 09-October-2016 to 08-October-2017

Parameters	Symbol	Data	Unit	Source
Number of Improved Cook stoves distributed		14,100	Nos.	PDD
Per capita woody biomass consumption		25.510	kg/ Month	Fixed Ex-ante
Number of family member		4.8	No./ Household	Fixed Ex-ante
Quantity of woody biomass used in absence of the project activity	B_{old}	1.469	Tonne /Year	Fixed Ex-ante
Efficiency of system being replaced	η_{old}	10%	%	Fixed Ex-ante
Efficiency of Improved cook stove	η_{new}	26.01%	%	Survey Findings
Quantity of woody biomass that is saved	$B_{y, savings}$	0.9043	Tonne /Year/ Household	Calculated
Fraction of woody biomass saved by the project activity in year y that can be established as non renewable biomass	$f_{NRB, y}$	87.9%		Fixed Ex-ante
Net calorific value of the non-renewable woody biomass that is substituted	$NCV_{biomass}$	0.015	TJ/ Tonne	Fixed Ex-ante
Emission factor for the substitution of non-renewable woody biomass by similar consumers.	$EF_{projected fossilfuel}$	81.600	tCO ₂ e /TJ	Fixed Ex-ante

Estimation of emission Reduction

Emission Reduction during the year y per cook stove without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA, per\ cook\ stove}$	0.9728	tCO ₂ e /Year /cook stove	Calculated
Actual Nos. of improved cook stove in operation		12,337	Nos.	Survey Findings
Emission Reduction for the project activity during the year y without gross adjustment factor for B_{old} to account for leakage	$ER_{y, WGA}$	12,001	tCO ₂ e /Year	Calculated

Leakage emission

Accounting Leakage emission (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 B_{old} i.e. 1.469 Tonne fuel wood /cook stove/ year and emission reduction estimated by considering the value of B_{old} estimated by multiplying B_{old} by a		0.04864	tCO ₂ e /Year /cook stove	Calculated
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net to gross adjustment factor of 0.95)				
Leakage factor for usage of traditional cook stoves		0		Calculated
Leakage emission per cook stove	LE _y , per cook stove	0.049		Calculated
Leakage emission for the project activity in the year y	LE _y	601		