



DISTRIBUTION OF IMPROVED COOK STOVE - PHASE 20



Document Prepared by EKI Energy Services Limited

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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 of Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts of Maharashtra who are provisioned with improved cookstoves under the project activity. It is worthwhile to note that firewood and wood chips contributes as major cooking fuel amongst rural households in India. According to the 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.

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

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.

³National 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 04.0

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).

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 14,300 Nos. improved cook stoves¹⁰ amongst Below Poverty Line (BPL) and Scheduled Tribes (ST) 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 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 12,855 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 and training, periodic maintenance¹² and post lifetime replacement within the crediting period.

The amount of emission reductions achieved for the current monitoring period is 61,485 tCO₂e.

The start date of the project activity is 07-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

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

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.

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
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Title	Authorized Signatory
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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
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Telephone	+91- 7828347589
Email	registry@enkingint.org

1.5 Project Start Date

The start date of the project activity is 07-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 07-October-2012 to 06-October-2022 (both dates inclusive). The improved cookstoves distributions were carried out between 07-October-2012 to 17-December- 2012 amongst 14,300 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 project is located in state Maharashtra, India.

The list of division is given below:

Division: Aurangabad

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

Division: Amravati

Districts: Buldhana, Akola, Washim, Amravati and Yavatmal

Division: Nagpur

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

Division	District	Latitude	Longitude
Aurangabad	Aurangabad	19.00 - 20.00° 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
	Bheed	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
	Chandrapur	18.40 - 20.50° N	78.50 - 80.60° E
	Ghadchiroli	18.43 - 21.50° N	79.45 - 80.53° E
	Gondia	20.39 - 21.38° N	79.27 - 80.42° E

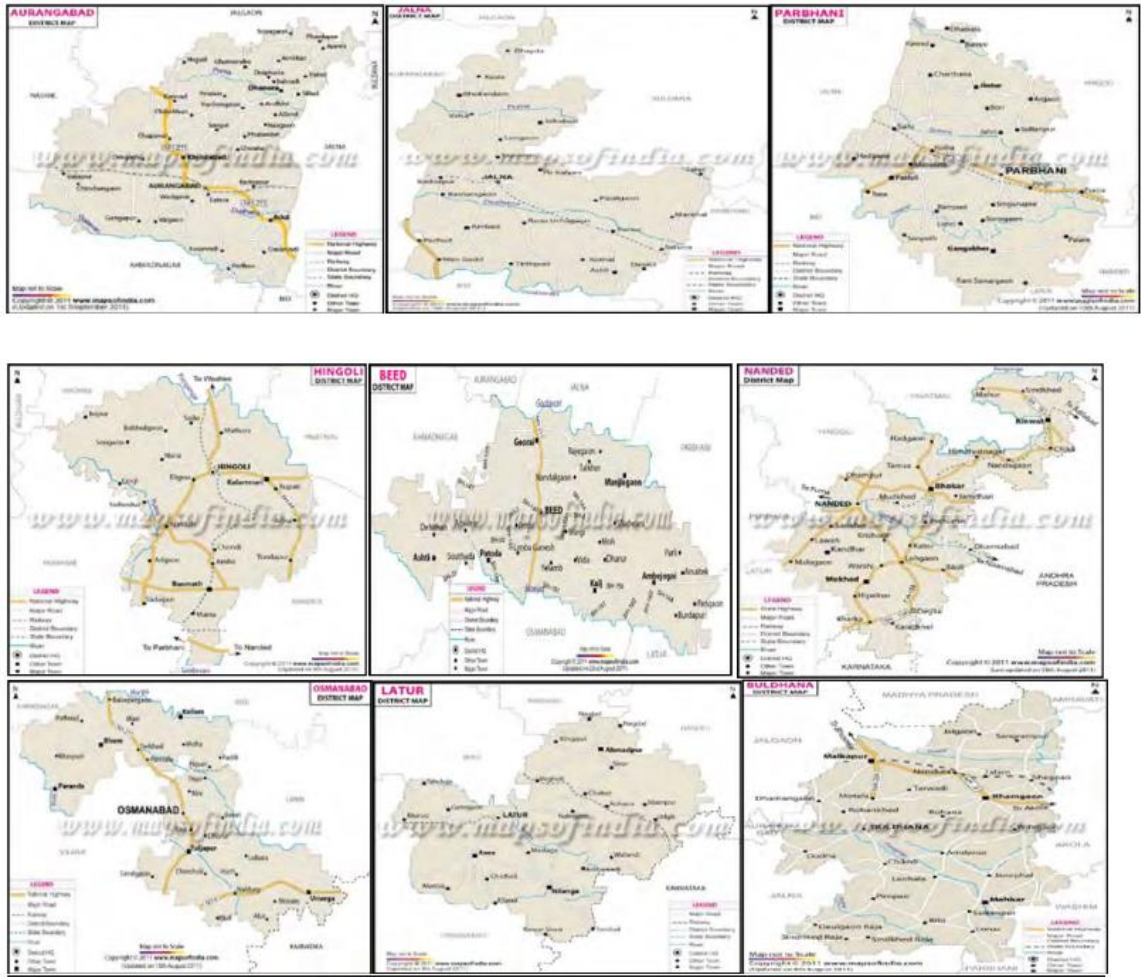
Map of India

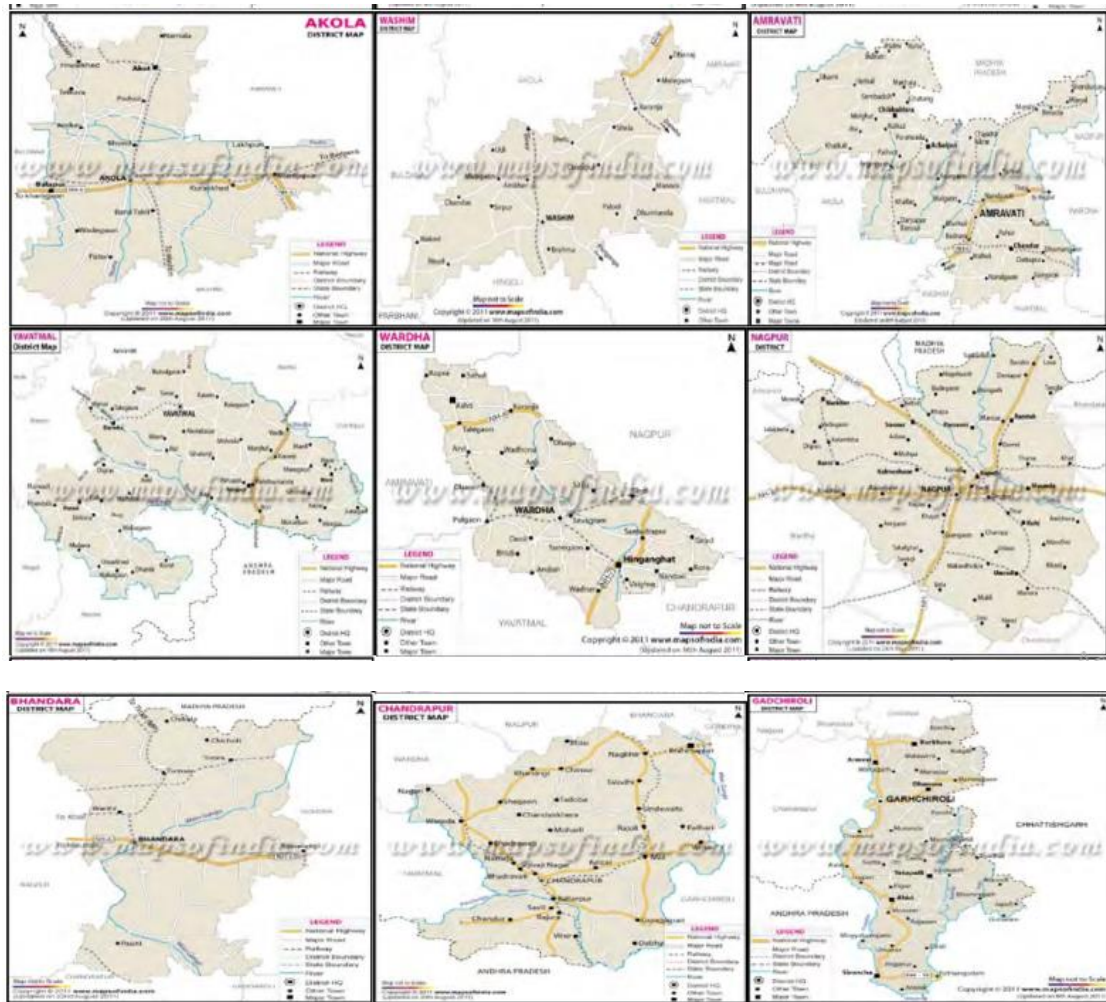


Map of Maharashtra



Map of Aurangabad , Jalna , Parbhani , Hingoli , Beed , Nanded , Osmanabad , Latur , Buldhana, Akola, Washim , Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur , Gadchiroli and Gondia





Aurangabad			Jalna		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Khupta	Sillod	1	Pirpimpalgaon	Jalna
2	Korhala	Sillod	2	Pokalwadgaon	Jalna
3	Kotnandra	Sillod	3	Pokhari Shindkhed	Jalna
4	Leha	Sillod	4	Pokhari Shingadi	Jalna
5	Lonwadi	Sillod	5	Punegaon	Jalna
6	Madni	Sillod	6	Rameshwar	Jalna
7	Mandgaon	Sillod	7	Ramnagar	Jalna
8	Mandna	Sillod	8	Ranmurti	Jalna
9	Mangrul	Sillod	9	Revgaon	Jalna
10	Mhasla Bk.	Sillod	10	Rohanwadi	Jalna
11	Mhasla Kh.	Sillod	11	Salegaon	Jalna
12	Modha Bk.	Sillod	12	Salegaon	Jalna
13	Modha Kh.	Sillod	13	Samangaon	Jalna
14	Mohal	Sillod	14	Sarwadi	Jalna
15	Mukpath	Sillod	15	Sarwadi	Jalna

Aurangabad			Jalna		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
16	Nanegaon	Sillod	16	Sawangi Talan	Jalna
17	Natvi	Sillod	17	Sawargaon Bhagde	Jalna
18	Nillod	Sillod	18	Sawargaon Hadap	Jalna
19	Palod	Sillod	19	Sevali	Jalna
20	Palshi	Sillod	20	Shambhu Sawargaon	Jalna
21	Panas	Sillod	21	Shevga	Jalna
22	Pangri	Sillod	22	Shivani Tanda	Jalna
23	Pendgaon	Sillod	23	Shivnagar	Jalna
24	Pimpaldari	Sillod	24	Shivni	Jalna
25	Pimpalgaon Ghat	Sillod	25	Shrikrushnagar	Jalna
26	Pimpalgaon Peth	Sillod	26	Sindhi Kalegaon	Jalna
27	Pimpri	Sillod	27	Siraswadi	Jalna
28	Pirola	Sillod	28	Solgawhan	Jalna
29	Rahimabad	Sillod	29	Somnath	Jalna
30	Relgaon	Sillod	30	Sondeo	Jalna
			31	Takarwan	Jalna
			32	Tandulwadi	Jalna
			33	Tandulwadi	Jalna
			34	Tatewadi	Jalna
			35	Thar	Jalna
			36	Thergaon	Jalna

Parbhani			Hingoli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Belura	Jintur	1	Donwada	Basmath
2	Bhambri	Jintur	2	Ekrukha	Basmath
3	Bhilaj	Jintur	3	Ganeshpur	Basmath
4	Bhogaon	Jintur	4	Girgaon	Basmath
5	Bhosi	Jintur	5	Govindpur T. Hayatnagar	Basmath
6	Bhusakvadi	Jintur	6	Gunda	Basmath
7	Bordi	Jintur	7	Gunj T. Asegaon	Basmath
8	Borgalwadi	Jintur	8	Hapsapur	Basmath
9	Bori	Jintur	9	Hatta	Basmath
10	Brahmangaon	Jintur	10	Hayatnagar	Basmath
11	Chamani	Jintur	11	Hiradgaon	Basmath
12	Chandaj	Jintur	12	Hisewadgaon	Basmath
13	Charthana	Jintur	13	Hiwara kh	Basmath
14	Chaudharni Bk	Jintur	14	Injangaon	Basmath
15	Chincholi Darade	Jintur	15	Jawala bk.	Basmath
16	Chincholi Ghute	Jintur	16	Jawala kh.	Basmath
17	Chincholi Kale	Jintur	17	Jawala traf babulgaon	Basmath
18	Chitnarwadi	Jintur	18	Jununa	Basmath
19	Dabha	Jintur	19	Kagban	Basmath

Parbhani			Hingoli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
20	Dagadchop	Jintur	20	Kalamba	Basmath
21	Dahegaon	Jintur	21	Kallavi	Basmath
22	Devgaon	Jintur	22	Kanhergaon	Basmath
23	Devsadi	Jintur	23	Kanosa	Basmath
24	Dhamdham	Jintur	24	Karanjala	Basmath
25	Dhanora Bk.	Jintur	25	Karanji	Basmath
26	Dhanora Devgaon	Jintur	26	Kaudgaon	Basmath
			27	Kawatha	Basmath
			28	Khajamapur	Basmath
			29	Khambala	Basmath

Beed			Nanded		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Deorayachiwadi	Bid	1	Khurgaon	Nanded
2	Devi Babhulgaon	Bid	2	Kikki	Nanded
3	Dhangarwadi	Bid	3	Kottirth	Nanded
4	Dhavjyachiwadi	Bid	4	Limbgaon	Nanded
5	Dhekan Moha	Bid	5	Markand	Nanded
6	Dhotra	Bid	6	Marlak Bk.	Nanded
7	Doiphodwadi	Bid	7	Marlak Kh.	Nanded
8	Ganganathwadi	Bid	8	Mujampeth	Nanded
9	Ganpur	Bid	9	Nagapur	Nanded
10	Gaulwadi	Bid	10	Naleshwar	Nanded
11	Gawari	Bid	11	Nandusa	Nanded
12	Ghargaon	Bid	12	Nasaratpur	Nanded
13	Ghat Jawala	Bid	13	Nerli	Nanded
14	Ghat Sawli	Bid	14	Nila	Nanded
15	Ghosapuri	Bid	15	Pangri	Nanded
16	Gogalwadi	Bid	16	Pasadgaon	Nanded
17	Golangri	Bid	17	Pimpalgaon	Nanded
18	Gundha	Bid	18	Pimpalgaon Korka	Nanded
19	Gundhewadi	Bid	19	Pimpalgaon Nimji	Nanded
20	Gunjala	Bid	20	Pimpri Mahipal	Nanded
21	Hingani	Bid	21	Pokharni	Nanded
22	Hingani	Bid	22	Punegaon	Nanded
23	Hingani Kh.	Bid	23	Puyni	Nanded
24	Hiwara Phadi	Bid	24	Rahati Bk.	Nanded
25	Imampur	Bid	25	Rahegaon	Nanded
			26	Sattarpur	Nanded
			27	Sayal	Nanded
			28	Siddhanath	Nanded

Beed			Nanded		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
			29	Someshwar	Nanded

Osmanabad			Latur		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Bembli	Osmanabad	1	Adolwadi	Udgir
2	Bhadachiwadi	Osmanabad	2	Anapwadi	Udgir
3	Bhanasgaon	Osmanabad	3	Arasnal	Udgir
4	Bhandari	Osmanabad	4	Avalkonda	Udgir
5	Bhandarwadi	Osmanabad	5	Bamni	Udgir
6	Bhikar Sarola	Osmanabad	6	Banshelki	Udgir
7	Borgaon raje	Osmanabad	7	Belshakarga	Udgir
8	Borkheda	Osmanabad	8	Bhakaskheda	Udgir
9	Bukanwadi	Osmanabad	9	Borgaon Bk.	Udgir
10	Chikhali	Osmanabad	10	Bortal Tanda	Udgir
11	Chilvadi	Osmanabad	11	Boyachiwadi	Udgir
12	Dakwadi	Osmanabad	12	Chandegaon	Udgir
13	Darphal	Osmanabad	13	Chighali	Udgir
14	Dautpur	Osmanabad	14	Chimachiwadi	Udgir
15	Deolali	Osmanabad	15	Chondi	Udgir
16	Dharur	Osmanabad	16	Dangewadi	Udgir
17	Dhoki	Osmanabad	17	Daul	Udgir
			18	Dawangaon	Udgir
			19	Deulwadi	Udgir
			20	Dewarjan	Udgir
			21	Dhadaknal	Udgir
			22	Dhondi Hipparga	Udgir
			23	Dhotarwadi	Udgir
			24	Digras	Udgir
			25	Dongarshelki	Udgir
			26	Ekurka Road	Udgir
			27	Gangapur	Udgir
			28	Gudsur	Udgir
			29	Gurdhal	Udgir
			30	Haibatpur	Udgir
			31	Haknakwadi	Udgir
			32	Halli	Udgir
			33	Handarguli	Udgir
			34	Hangarga Kudar	Udgir
			35	Hanmantwadi	Udgir

Buldhana			Akola		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Ambashi	Chikhli	1	Dalambi	Akola
2	Amdapur	Chikhli	2	Dapaki	Akola
3	Amkhed	Chikhli	3	Dapura	Akola
4	Amona	Chikhli	4	Devali	Akola
5	Ancharwadi	Chikhli	5	Dhaga	Akola
6	Andhai	Chikhli	6	Dhamana	Akola
7	Antri Khedekar	Chikhli	7	Dhotardi	Akola
8	Antri Koli	Chikhli	8	Dodaki	Akola
9	Anwi	Chikhli	9	Dongargaon	Akola
10	Asola Naik	Chikhli	10	Donwada	Akola
11	Asola Pr.kherda	Chikhli	11	Dudhala	Akola
12	Babhulgaon	Chikhli	12	Dudhalam	Akola
13	Berala	Chikhli	13	Ekalara	Akola
14	Bhalgaon	Chikhli	14	Faramardabad	Akola
15	Bhankhed.	Chikhli	15	Gandhigram	Akola
16	Bharosa	Chikhli	16	Ganori	Akola
17	Bhogawati	Chikhli	17	Ghusar	Akola
18	Bhokar	Chikhli	18	Ghusarwadi	Akola
19	Bhorsa	Chikhli	19	Gonapur	Akola
20	Bhorse	Chikhli	20	Gondapur	Akola
21	Borala	Chikhli	21	Gopalkhed	Akola
22	Borgaon Kakade	Chikhli	22	Goregaon Bk	Akola
			23	Goregaon Kh	Akola
			24	Gotra	Akola
			25	Gudadhi	Akola
			26	Hatla	Akola
			27	Hingma Tamaswadi	Akola

Washim			Amravati		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Bhadshivni	Karanja	1	Bhemdi	Warud
2	Bhambdevi	Karanja	2	Chandas	Warud
3	Bhilkheda	Karanja	3	Chinchargavhan	Warud
4	Bhiwari	Karanja	4	Dabhi	Warud
5	Bhuloda	Karanja	5	Jarud	Warud
6	Bramhanwada	Karanja	6	Dawargaon	Warud
7	Chandhai	Karanja	7	Deutwada	Warud
8	Dadgaon	Karanja	8	Dhaga	Warud
9	Dhamni	Karanja	9	Dhamandhas	Warud
10	Dhangarkhed	Karanja	10	Dhanodi	Warud
11	Dhanj Bk	Karanja	11	Ekalvihir	Warud
12	Dhanj Kh	Karanja	12	Ekdara	Warud

Washim			Amravati		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
13	Dhanora Tathod	Karanja	13	Fattepur	Warud
14	Dhotra	Karanja	14	Gadegaon	Warud
15	Dhotra	Karanja	15	Gavhankund	Warud
16	Dighi	Karanja	16	Ghorad	Warud
17	Donad Bk.	Karanja	17	Goregaon	Warud
18	Dongargaon	Karanja	18	Haturna	Warud
19	Dudhora	Karanja	19	Isambari	Warud
20	Gaiwal	Karanja	20	Isapur	Warud
21	Ganeshpur	Karanja	21	Jarud	Warud
22	Gangapur	Karanja	22	Ittamgaon	Warud
23	Girda	Karanja	23	Jamalpur	Warud
24	Hinganwadi	Karanja	24	Jamgaon	Warud
25	Hiwara	Karanja	25	Jamgaon Mahendri	Warud
26	Inza	Karanja	26	Jamtal	Warud
27	Jaipur	Karanja	27	Jamthi Ganeshpur	Warud
28	Jalalpur	Karanja			
29	Jamb	Karanja			
30	Jamthi Kh.	Karanja			
31	Janori	Karanja			
32	Januna	Karanja			
33	Kajaleshwar	Karanja			
34	Kakadshivni	Karanja			
35	Kali	Karanja			
36	Kamargaon	Karanja			

Yavatmal			Wardha		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Kalaspur	Kalamb	1	Burkoni	Hinganghat
2	Kamathwada	Kalamb	2	Chanki	Hinganghat
3	Kanholi	Kalamb	3	Chichaghat	Hinganghat
4	Karak	Kalamb	4	Chichghat	Hinganghat
5	Katri	Kalamb	5	Chikmoh	Hinganghat
6	Khadki	Kalamb	6	Chincholi	Hinganghat
7	Khairi	Kalamb	7	Dabha	Hinganghat
8	Khateshwar	Kalamb	8	Dag	Hinganghat
9	Khorad Bk.	Kalamb	9	Daigavhan	Hinganghat
10	Khorad Kh	Kalamb	10	Dalalpur	Hinganghat
11	Khudawantpur	Kalamb	11	Daroda	Hinganghat
12	Khutala	Kalamb	12	Dawlapur	Hinganghat
13	Kinhala	Kalamb	13	Dhamangaon	Hinganghat
14	Kinwat	Kalamb	14	Dhanora	Hinganghat
15	Kolezari	Kalamb	15	Dhiwri Pipari	Hinganghat

Yavatmal			Wardha		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
16	Kotha	Kalamb	16	Dhochi	Hinganghat
17	Pimpri	Babulgaon	17	Donduda	Hinganghat
18	Pratappur	Babulgaon	18	Dorla	Hinganghat
19	Rani Amravati	Babulgaon	19	Fattepur	Hinganghat
20	Renakapur	Babulgaon	20	Fukta	Hinganghat
21	Sarfali	Babulgaon	21	Gadegaon	Hinganghat
22	Sarul	Babulgaon	22	Ganeshpur	Hinganghat
			23	Gangapur	Hinganghat
			24	Gangapur	Hinganghat
			25	Gaul	Hinganghat
			26	Ghatsavli	Hinganghat
			27	Govindpur	Hinganghat
			28	Hadsti	Hinganghat
			29	Hivara	Hinganghat
			30	Inzala	Hinganghat

Nagpur			Bhandara		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Neri	Kamptee	1	Dhorwada	Tumsar
2	Nimbha	Kamptee	2	Dhuteri	Tumsar
3	Palsad	Kamptee	3	Dongari Bk.	Tumsar
4	Pandherkawada	Kamptee	4	Dongarla	Tumsar
5	Pandhurna	Kamptee	5	Gaimukh	Tumsar
6	Panjara	Kamptee	6	Garkabhonga	Tumsar
7	Parsodi	Kamptee	7	Garra	Tumsar
8	Pawangaon	Kamptee	8	Gobarwahi	Tumsar
9	Powari	Kamptee	9	Gondekhari	Tumsar
10	Ranala	Kamptee	10	Gonditola	Tumsar
11	Ranmangali	Kamptee	11	Gonditola	Tumsar
12	Sawali	Kamptee	12	Gowaritola	Tumsar
13	Selu	Kamptee	13	Gowaritola	Tumsar
14	Shirpur	Kamptee	14	Gudru Kh.	Tumsar
15	Shivani	Kamptee	15	Hardoli	Tumsar
16	Sonegaon	Kamptee	16	Hardoli	Tumsar
17	Suradevi	Kamptee	17	Hasara	Tumsar
18	Tandulwani	Kamptee	18	Hingana	Tumsar
19	Tarodi bk.	Kamptee	19	Hirapur Hamesha	Tumsar
20	Jatamkhora	Savner	20	Kamkasur	Tumsar
21	Joga	Savner	21	Karkapur	Tumsar
22	Karajghat	Savner	22	Karli	Tumsar
23	Katodi	Savner	23	Kawalewada	Tumsar
24	Kawadas	Savner	24	Khairlanji	Tumsar

Nagpur			Bhandara		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
25	Kawatha	Savner	25	Khandal	Tumsar
26	Kelwad	Savner	26	Khapa	Tumsar
27	Khairi	Savner	27	Khapa	Tumsar
28	Khairi	Savner	28	Khapa Mohadi	Tumsar
29	Khangaon	Savner	29	Kharabi	Tumsar
			30	Koshti	Tumsar
			31	Kurmuda	Tumsar
			32	Lanzera	Tumsar
			33	Rajapur	Tumsar
			34	Rampur Hamesha	Tumsar
			35	Ranera	Tumsar
			36	Rengepar	Tumsar

Chandrapur			Gadchiroli		
Sr.	Name of the Village	Taluka	Sr.	Name of the Village	Taluka
1	Arvi	Warora	1	Abanpalli	Aheri
2	Asala	Warora	2	Aldandi	Aheri
3	Ashi	Warora	3	Allapalli	Aheri
4	Ashti	Warora	4	Ambezara	Aheri
5	Atmurdi	Warora	5	Appapalli	Aheri
6	Bakharda	Warora	6	Arenda	Aheri
7	Bamarda	Warora	7	Arkapalli	Aheri
8	Bandara	Warora	8	Asa M	Aheri
9	Barvha	Warora	9	Asali	Aheri
10	Belgaon Desh	Warora	10	Avalmari	Aheri
11	Bembal Tukum	Warora	11	Bhangaram Petta	Aheri
12	Bhatala	Warora	12	Bhaswapur	Aheri
13	Bhendala	Warora	13	Birhadghat	Aheri
14	Bodakha	Warora	14	Bori	Aheri
15	Bopapur	Warora	15	Botlacheru	Aheri
16	Borda	Warora	16	Burukmalampalli	Aheri
17	Borgaon Bhosale	Warora	17	Chandra M	Aheri
18	Borgaon De	Warora	18	Chandra S	Aheri
19	Borgaon Shiwanfal	Warora	19	Chaudampalli	Aheri
20	Bori	Warora	20	Cherapallidina	Aheri
21	Chak Kawadapur	Warora	21	Cherpalli S	Aheri
22	Chargaon Bk.	Warora	22	Chhallelwada	Aheri
23	Chargaon Kh.	Warora	23	Chinchgundi	Aheri
24	Chimur	Chimur			
25	Dabaka Heti	Chimur			

Gondia		
Sr.	Name of the Village	Taluka
1	Kachewani	Tirora
2	Karti bk.	Tirora
3	Karti kh.	Tirora
4	Kawalewada	Tirora
5	Kesalwada	Tirora
6	Khadaki	Tirora
7	Khairbodi	Tirora
8	Khairi	Tirora
9	Khairlanji	Tirora
10	Khamari	Tirora
11	Khedepar	Tirora
12	Khodgaon	Tirora
13	Khopada	Tirora
14	Khurkhuli	Tirora
15	Khursipar	Tirora
16	Kindgipar	Tirora
17	Kodelohara	Tirora
18	Kodobarra	Tirora
19	Koylari	Tirora
20	Kulpa	Tirora
21	Lakhegaon	Tirora
22	Ledada	Tirora
23	Lonara	Tirora
24	Malhi	Tirora
25	Malpuri	Tirora
26	Mandawi	Tirora
27	Mangezari	Tirora
28	Manora	Tirora
29	Marartola	Tirora
30	Maregaon	Tirora
31	Mendha	Tirora
32	Mendipur	Tirora

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 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 is 9436

<https://cdm.unfccc.int/Projects/DB/RWTUV1356871614.6/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 9346. 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 cook stoves in this project activity (fourteenth Phase) are distributed in Aurangabad, Jalna, Parbhani, Hingoli, Beed, Nanded, Osmanabad, Latur, Buldhana, Akola, Washim, Amravati, Yavatmal, Wardha, Nagpur, Bhandara, Chandrapur, Gadchiroli and Gondia districts of Maharashtra which lies in the Aurangabad, Amravati and Nagpur division jurisdiction. The stakeholders consultation conducted on 2nd and 3rd February 2012 at Nagpur, Latur and Washim district in Aurangabad, Amravati and Nagpur covered this project location and the consultation was also conducted before webhosting of the PDD. The meetings were attended by members from various backgrounds as listed below –

Participant of Nagpur meeting –

Sl. No.	Name of Person	Designation
1	Gopal R Kabra	CEO, GKEMPL
2	Raju Babasaheb Kadam	Farmer
3	Sopan Sham Kale	Student
4	Jitesh Gawale	Working professional
5	Kartik Kumar	Student
6	Imran Munjaver	Businessman
7	Makrand Mane	Working professional
8	Rahul Awtade	Businessman
9	Raju Namdev Pagar	Working professional
10	Sanjay Shinde	Businessman

Participant of Latur meeting –

Sl. No.	Name of Person	Designation
1	Vikram Kale	Sr. Operator
2	Namdev Kale	Student

3	Ramesh Padval	Farmer
4	Apparao Gonje	Working professional
5	Dinesh Kamble	Farmer
6	Goremama	Working professional
7	Pritesh Choudhury	Working professional
8	Vayjanath Navgire	Working professional
9	Papu Jagdale	Working professional
10	Somnath Lohar	Working professional
11	Shivaji Karad	Working professional
12	Somanath Chandane	Farmer
13	Kondeba Manere	Working professional
14	Rajkumar Shinde Working	Working professional
15	Vishal Pandit	Farmer

Participant of Washim meeting –

Sl. No.	Name of Person	Designation
1	Chandrakant Jaising Bhadre	Farmer
2	Jaganath Kadam	Working professional
3	Anand Bhanudass Pawar	Working professional
4	Appa Navgire	Working professional
5	Gautam Suryavanshi	Working professional
6	Rangarao Suryavanshi	Farmer
7	Dhanjay Suryavanshi	Farmer
8	Bhaskar Bhadre	Farmer
9	Satish Jagtap	Student
10	Ganesh Bhosale	Working professional
11	Sachin Jagdale	Working professional
12	Ashok Ghorpade	Working professional
13	Dhanjay Sanjekar	Working professional
14	Padmakar Meshram	Farmer
15	Vijay Navalkar	Farmer
16	Amol Barkue	Farmer
17	Prakash Subash Jhande	Working professional
18	Shaji Rathod	Working professional
19	Madhular Rathod	Local representative
20	Milind Bondge	Local representative
21	Mustaffa Mukadam Shekh	Local representative
22	Prithviraj Suryavanshi	Marketing Executive, Vikram Stoves

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

The stakeholder's comments sought during the meeting in following manners –

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

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

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

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

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

Queries	Reply
Whether there is any possibility of negative impact to the health of the user or to the local environment?	The representative from Vikram Stoves explained that, there will be no detrimental effect on user's health due to the project activity as it is contributing in pollution reduction. Rather, the project is reducing fire-wood consumption through improved combustion technology and thereby reducing deforestation and green-house gases

	emission. Apart from this, the project is reducing indoor air pollution by means of smoke reduction.
The benefits that users of Improved Cook stove will receive from the project activity?	Mr. Suryavanshi representative from Vikram Stoves replied that, use of improved cook stoves for household cooking will reduce the indoor air pollution, cooking time and also fuel-wood consumption due to higher efficiency. Moreover, the users of improved cook stoves will get free maintenance service and free of cost replacement of the system at the end of its lifetime.
Clarification whether the plants to be installed in future will get this benefit?	Addressing to the query Mr. Suryavanshi, representative from Vikram Stoves replied that, all the improved cook stoves distributed after a particular date will be considered for carbon credit benefit under these projects. But, the no. of systems to be considered under the projects depends upon the threshold limit as given by the UNFCCC. Therefore, may be all stoves cannot be considered.
How long the user will get this benefit?	Responding to the query Mr. Suryavanshi representative from Vikram Stoves replied that, ICS systems considered under the project will receive free of cost maintenance service for 10 years post registration.

The ongoing communication is being done via grievance register. No grievances have been received in the current monitoring period.

2.3 AFOLU-Specific Safeguards

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

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

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

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))

current phase pertains to different batch of manufacturing, but since the products are being manufactured complying to a particular performance standard (IS13152 (Part 1):1991) the quality output for each unit of products complies to a minimum level.

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

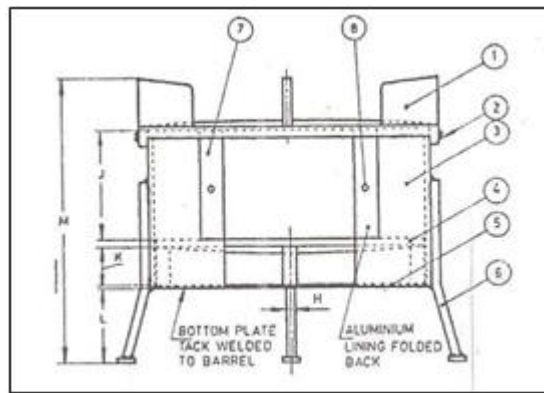
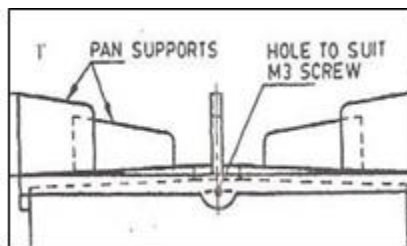
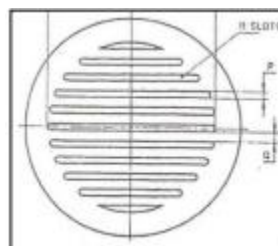


Diagram of Improved Cook Stove

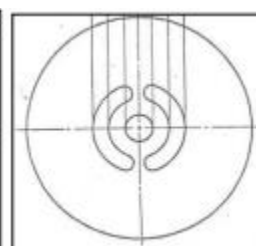
1. Top plate,
2. Screw,
3. Barrel,
4. Grate,
5. Bottom Plate,
6. Legs,
7. Aluminium Lining and
8. Rivet



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 B_y , 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 B_{old} 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 B_{old} to estimate the B_{old} to be used for emission reduction calculation.

Data / Parameter	η_{new}
Data unit	%
Description	Efficiency of the cook stove being deployed as a part of the project activity
Source of data	Test report issued by Biomass Cook stove Testing Centre, Dept. of Renewable Energy Sources, Udaipur
Value applied	29.88%
Justification of choice of data or description of measurement methods and procedures applied	Thermal efficiency test carried out as per water Boiling Test Protocol specified as per IS13152 protocol.
Purpose of Data	Efficiency of the improved cookstoves is used to estimate the saving in fuel wood. (The factor is not fixed ex-post and estimated based on monitored efficiency of sample number of cookstoves)
Comments	The value of Efficiency is monitored on an annual basis and vintage wise.

Data / Parameter	$B_{y,savings}$
Data unit	tonne/household/year
Description	Quantity of woody biomass saved due to implementation of the project activity
Source of data	Calculated
Value applied	0.9774
Justification of choice of data or description of	$B_{y,savings}$ is calculated using equation $B_{y,savings} = B_{old} * (1 - \eta_{old} / \eta_{new})$

measurement methods and procedures applied	$=1.469 \times (1 - 0.1/0.2988)$ $=0.9774 \text{ tonne /household/year}$
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.

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
	07 Oct 12 - 06 Oct 13	25-11-2013 27-11-2013 07-12-2013 03-12-2013 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	28.61%
	07 Oct 13 - 06 Oct 14	09-01-2015 27-11-2014 07-12-2014 03-12-2014 25-11-2014 11-01-2015 13-01-2015	40	28.09%

		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		
	07 Oct 14 - 06 Oct 15	13-01-2016 03-12-2015 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	40	27.01%
	07 Oct 15 - 06 Oct 16	07-12-2016 09-01-2017 25-11-2016 27-11-2016 03-12-2017 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	27.02%
	07 Oct 16 - 06 Oct 17	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	26.02%

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
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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																								
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.
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Data / Parameter	No. cook stoves in use												
Data unit	Number												
Description	The number of improved cook stoves distributed to households under the project activity and under operation.												
Source of data	Third party agency survey report and database managed by the Project Participant (the end user agreement)												
Description of measurement methods and procedures to be applied	The monitoring consists of third-party survey of representative sample on annual basis to evaluate the number of systems in operation. The percentage of cook stove in usage as estimated from the survey result is multiplied with the total number of cook stove to determine number of cook stove in operation and to be considered for the purpose of emission reduction calculation.												
Frequency of monitoring/recording	Number of improved cookstoves under operation is monitored annually based on sample survey												
Value monitored	During survey in case beneficiaries were evaluated to be using improved cook stoves for a limited period along with usage of traditional cookstoves the beneficiaries are considered as partial users. Partial users are beneficiaries /household, those who have not discontinued using of ICS but have been using ICS for a limited period and also using traditional cookstoves for the purpose of cooking along with ICS. Since the number of days of operation of partial ICS usage during a particular crediting period is hard to ascertain (uncertainty of estimation) therefore as a conservative approach the beneficiaries /household using ICS partially are considered as discontinued users for the purpose of estimating emission reduction. <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>07 Oct 12 - 06 Oct 13</td><td>0</td><td>25-11-2013 27-11-2013 07-12-2013 03-12-2013 09-01-2014 11-01-2014 13-01-2014 13-01-2014 15-01-2014</td><td>160</td><td>2.50%</td><td>97.5%</td></tr></table>	Period	No. of Dis-continued user	Date of Survey	Number of beneficiaries surveyed	% of partial users	% of users used ICS only	07 Oct 12 - 06 Oct 13	0	25-11-2013 27-11-2013 07-12-2013 03-12-2013 09-01-2014 11-01-2014 13-01-2014 13-01-2014 15-01-2014	160	2.50%	97.5%
Period	No. of Dis-continued user	Date of Survey	Number of beneficiaries surveyed	% of partial users	% of users used ICS only								
07 Oct 12 - 06 Oct 13	0	25-11-2013 27-11-2013 07-12-2013 03-12-2013 09-01-2014 11-01-2014 13-01-2014 13-01-2014 15-01-2014	160	2.50%	97.5%								

			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			
	07 Oct 13 - 06 Oct 14	0	09-01-2015 27-11-2014 07-12-2014 03-12-2014 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	160	3.13%	96.88%
	07 Oct 14 - 06 Oct 15	0	13-01-2016 03-12-2015 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	5.63%	94.38%
	07 Oct 15 - 06 Oct 16	0	07-12-2016 09-01-2017 25-11-2016 27-11-2016 03-12-2017 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	7.50%	92.50%
	07 Oct 16 - 06 Oct 17	0	25-11-2017 11-01-2018 13-01-2018	160	10.00%	90.00%

	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
	Number of Improved Cook stoves distributed – 14,300
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	<table><tr><th>Period</th><th>Total number of beneficiaries</th><th>Number of beneficiaries for which defunct date was a day/more</th><th>Average days of operation</th></tr><tr><td>07 Oct 12 - 06 Oct 13</td><td>14,300</td><td>0</td><td>365</td></tr><tr><td>07 Oct 13 - 06 Oct 14</td><td>14,300</td><td>0</td><td>365</td></tr><tr><td>07 Oct 14 - 06 Oct 15</td><td>14,300</td><td>0</td><td>365</td></tr><tr><td>07 Oct 15 - 06 Oct 16</td><td>14,300</td><td>0</td><td>365</td></tr><tr><td>07 Oct 16 - 06 Oct 17</td><td>14,300</td><td>0</td><td>365</td></tr></table>				Period	Total number of beneficiaries	Number of beneficiaries for which defunct date was a day/more	Average days of operation	07 Oct 12 - 06 Oct 13	14,300	0	365	07 Oct 13 - 06 Oct 14	14,300	0	365	07 Oct 14 - 06 Oct 15	14,300	0	365	07 Oct 15 - 06 Oct 16	14,300	0	365	07 Oct 16 - 06 Oct 17	14,300	0	365
Period	Total number of beneficiaries	Number of beneficiaries for which defunct date was a day/more	Average days of operation																									
07 Oct 12 - 06 Oct 13	14,300	0	365																									
07 Oct 13 - 06 Oct 14	14,300	0	365																									
07 Oct 14 - 06 Oct 15	14,300	0	365																									
07 Oct 15 - 06 Oct 16	14,300	0	365																									
07 Oct 16 - 06 Oct 17	14,300	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.
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Data / Parameter	Number of days of functioning of traditional cook stoves
Data unit	Number
Description	The parameters refer to the number of days for which the traditional cook stove is being used by the household.
Source of data	Annual third-party agency survey of representative sample household
Description of measurement methods and procedures to be applied	Survey is carried out to estimate the number of days for which the household has operated the traditional cook stove during a particular monitoring period.
Frequency of monitoring/recording	Number of days of functioning of traditional cook stoves is monitored annually based on sample survey
Value monitored	0 During survey in case beneficiaries were evaluated to be using improved cook stoves for a limited period along with usage of traditional cookstoves the beneficiaries are considered as partial users. Partial users are beneficiaries /household, those who have not discontinued using of ICS but have been using ICS for a limited period and also using traditional cookstoves for the purpose of cooking along with ICS. Since the number of days of operation of partial ICS usage during a particular crediting period is hard to ascertain (uncertainty of estimation), therefore as a conservative approach the beneficiaries /household using ICS partially are considered as discontinued users. Since the beneficiary using traditional cookstoves were opted out of emission reduction estimation therefore the beneficiaries considered resembles only to those who are using improved cookstoves. Therefore the days of usage of traditional cookstoves for beneficiaries considered is zero.
Monitoring equipment	-
QA/QC procedures to be applied	The survey is carried out by third party agency and is co-ordinated by the project proponent.
Purpose of the data	For estimation of baseline emission

Calculation method	-
Comments	Number of days of operation of the traditional cook stove is obtained from the result of sample survey. The number of days of traditional cook stove as per the survey is used to obtain the average days of usage of the traditional cook stoves for all the households who still use the improved cook stoves of this project activity. This average day is used to arrive at a factor - $\text{Factor} = (365 - \text{Average number of days of traditional cook stove usage in all households}) / 365$

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
	07 Oct 12 - 06 Oct 13	14,300	0	0
	07 Oct 13 - 06 Oct 14	14,300	0	0
	07 Oct 14 - 06 Oct 15	14,300	0	0
	07 Oct 15 - 06 Oct 16	14,300	0	0
	07 Oct 16 - 06 Oct 17	14,300	0	0
Monitoring equipment	-			
QA/QC procedures to be applied	The copy of the new end user agreement for the replaced cook stove along with the efficiency certificate of the new system is archived along with the existing agreement. The database is updated as and when the system is replaced.			
Purpose of the data	Assessment of baseline emission			
Calculation method	-			

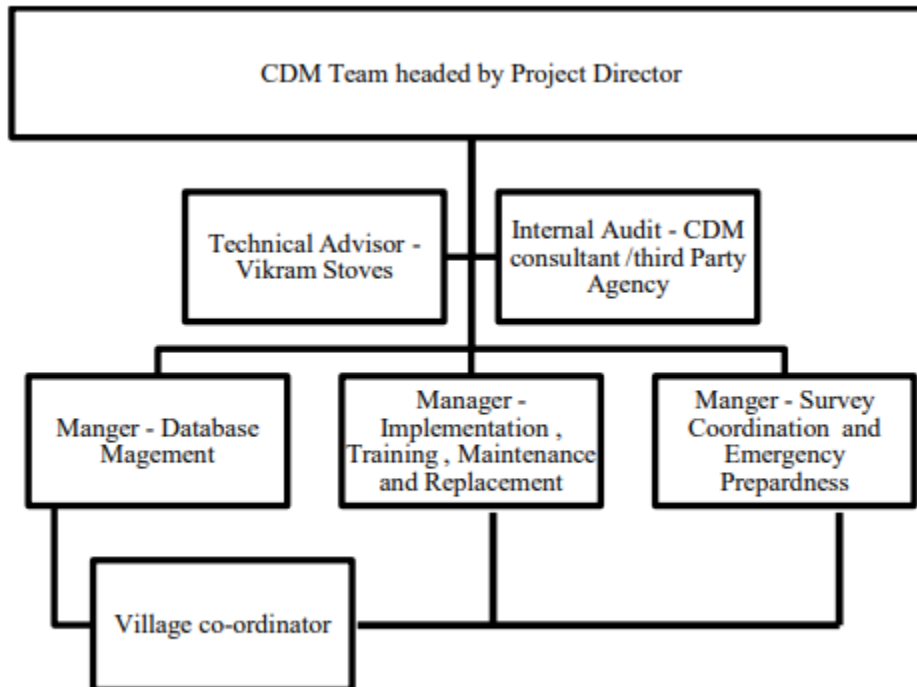
Comments	The record of database and copy of end user agreements (both new and old one) is maintained by the project participant for the period of two years after the last issuance.																				
Data / Parameter	B_{y, savings}																				
Data unit	Tonnes/year/household																				
Description	Quantity of woody biomass that is saved through the project activity.																				
Source of data	calculated																				
Description of measurement methods and procedures to be applied	The quantity of woody biomass saved is calculated following the equation $B_{y, \text{saving}} = B_{\text{old}} * (1 - \eta_{\text{old}}/\eta_{\text{new}})$ 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	<table><tr><th>Period</th><th>Operational Efficiency considered</th><th>Estimated By savings/ ICS</th></tr><tr><td>07 Oct 12 - 06 Oct 13</td><td>28.61%</td><td>0.9556</td></tr><tr><td>07 Oct 13 - 06 Oct 14</td><td>28.09%</td><td>0.9461</td></tr><tr><td>07 Oct 14 - 06 Oct 15</td><td>27.01%</td><td>0.9251</td></tr><tr><td>07 Oct 15 - 06 Oct 16</td><td>27.02%</td><td>0.9253</td></tr><tr><td>07 Oct 16 - 06 Oct 17</td><td>26.02%</td><td>0.9045</td></tr></table>			Period	Operational Efficiency considered	Estimated By savings/ ICS	07 Oct 12 - 06 Oct 13	28.61%	0.9556	07 Oct 13 - 06 Oct 14	28.09%	0.9461	07 Oct 14 - 06 Oct 15	27.01%	0.9251	07 Oct 15 - 06 Oct 16	27.02%	0.9253	07 Oct 16 - 06 Oct 17	26.02%	0.9045
Period	Operational Efficiency considered	Estimated By savings/ ICS																			
07 Oct 12 - 06 Oct 13	28.61%	0.9556																			
07 Oct 13 - 06 Oct 14	28.09%	0.9461																			
07 Oct 14 - 06 Oct 15	27.01%	0.9251																			
07 Oct 15 - 06 Oct 16	27.02%	0.9253																			
07 Oct 16 - 06 Oct 17	26.02%	0.9045																			
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 manager). 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 complaint 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.
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

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.

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 –

- 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.
- 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.
- 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 14,300.

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

Sample Size:

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

$$n \geq 1.6452N * p * (1-p) / ((N-1) * 0.12 * p^2 + 1.6452 * p*(1-p))$$

Where,

N	=	Sample size
N	=	14,300
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
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/14,300, i.e., 160/14,300. 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
Household	Operational procedure Scheduled maintenance Itemised recording and reporting	Vikram Stoves (for item no 1. and 2) team (for item 3)	After distribution	Once
Village Coordinator	Monitoring of the related parameter like Spot check of cook stove usage, situational review Database management and coordination with team System Maintenance	VCS team (for item no. 1 and 2) Vikram Stoves (for item 3)	On appointment	Once in a year
VCS team	Database management Undertaking Monitoring, Recording and archiving Preparation of monitoring report	Consultant and Top Management of the Project participant	On registration	Once in a year

Quality Assurance and Quality Control of monitoring activities–

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

1. The internal review is carried out in every six month for compliance check in accordance to the manual.

2. Non conformity if noted is reported and brought into the notice of the top management and measures is undertaken to ensure that required compliance is met.
3. Training on the monitoring if felt by the auditor is imparted to the team.

Emergency Preparedness

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

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

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline Emissions is estimated in following way –

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

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

Parameter	Data	Unit
B_{old}	1.469	Tonne fuel wood /cook stove/ year
$B_{y, savings}$	0.9774	Tonne fuel wood /cook stove/ year
$f_{NRB,y}$	87.90%	
$NCV_{biomass}$	0.015	TJ/tonne
$EF_{projected fossil fuel}$	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 _{2e} /cook stove/ year
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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 13,532 tCO_{2e} /year.

The Baseline Emissions achieved for this monitoring period is 64,725 tCO_{2e} /year.

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

Third party assessment for monitoring period – Year 1			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-2116	Jijabai Pralhad Kolpe	Beed	28.614%
GKEMPLPH-20-5304	Pandurang Malahari Wankhede	Akola	28.638%
GKEMPLPH-20-4766	Shivaba Yashvantarav Mule	Buldhana	28.643%
GKEMPLPH-20-11417	Muktiram Jankiram Ladane	Gadchiroli	28.710%
GKEMPLPH-20-3627	Balaram Laxminarayan Jaiswal	Osmanabad	28.759%
GKEMPLPH-20-4730	Mohansing Durgasing Sikarwar	Buldhana	28.789%
GKEMPLPH-20-12871	Ramesh Pandurang Dalvi	Gadchiroli	28.802%
GKEMPLPH-20-9663	Bhagshri Laxmikant Fulari	Nagpur	28.831%
GKEMPLPH-20-8242	Khandu Vitthal Sagute	Yavatmal	28.846%
GKEMPLPH-20-12293	Godawari Shivappa Kautkar	Gadchiroli	28.882%
GKEMPLPH-20-3716	Surekha Sundarrao Borade	Osmanabad	28.883%
GKEMPLPH-20-2466	Vikas Purushottam Agrawal	Nanded	28.898%
GKEMPLPH-20-11296	Rajesh Daulatrao Deshmukh	Chandrapur	28.902%
GKEMPLPH-20-2904	Dadarao Tukaramji Renge	Nanded	28.905%
GKEMPLPH-20-11484	Sunil Jagannath Chavan	Gadchiroli	28.919%
GKEMPLPH-20-6085	Subhash Viththalrao Bokhare	Washim	28.920%
GKEMPLPH-20-8886	Vishnu Dhondiram Ekhe	Wardha	28.929%
GKEMPLPH-20-5438	Dulaji Kisan Sarkate	Akola	28.933%
GKEMPLPH-20-4187	Vitthalrao Babarao Adkine	Latur	28.942%
GKEMPLPH-20-13603	Madhavrao Yadavrao Bhise	Gondia	28.946%
GKEMPLPH-20-10099	Vishwanath Shivram Kapure	Bhandara	28.949%
GKEMPLPH-20-9393	Bhaurao Chandrabhan Bhise	Nagpur	29.010%
GKEMPLPH-20-1105	Laxmibai Kisanrao Jahirrao	Parbhani	29.010%

Third party assessment for monitoring period – Year 1			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-11148	Ashok Kundlikrao Sirsat	Chandrapur	29.042%
GKEMPLPH-20-10300	Sahdev Maroti Sarkate	Bhandara	29.054%
GKEMPLPH-20-14052	Rajabhau Anantrao Chavan	Gondia	29.058%
GKEMPLPH-20-1322	Ramesh Sakharan Tarte	Parbhani	29.095%
GKEMPLPH-20-8805	Asaram Umaji Panjage	Wardha	29.100%
GKEMPLPH-20-1655	Santosh Pralhad Dhawle	Hingoli	29.184%
GKEMPLPH-20-11647	Annapurna Nagorao Delmade	Gadchiroli	29.190%
GKEMPLPH-20-7204	Vitthal Manikrao Chimane	Amravati	29.228%
GKEMPLPH-20-2062	Prakash Babarao Fuke	Beed	29.236%
GKEMPLPH-20-8048	Nagorao Ambadas Madrap	Yavatmal	29.257%
GKEMPLPH-20-717	Shesherao Govindrao Sawandkar	Jalna	29.299%
GKEMPLPH-20-1611	Prameshwar Uttamrao Mangdare	Hingoli	29.303%
GKEMPLPH-20-4288	Baban Kanhoji More	Latur	29.339%
GKEMPLPH-20-396	Bhagawan Khanduji Ghuge	Aurangabad	29.403%
GKEMPLPH-20-7409	Sachin Gautam Parade	Amravati	29.472%
GKEMPLPH-20-6520	Bhagyshri Santosh Deshmukh	Washim	29.484%
GKEMPLPH-20-853	Hanuman Vachishta Tile	Jalna	29.677%

Third party assessment for monitoring period – Year 2			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-2024	Janakabai Dnyanaraj Shinde	Beed	28.093%
GKEMPLPH-20-11339	Santosh Jagannath Magar	Gadchiroli	28.151%
GKEMPLPH-20-8298	Ratnabai Mukindrao Zare	Yavatmal	28.283%
GKEMPLPH-20-1738	Pravin Sureshrao Kahat	Hingoli	28.340%
GKEMPLPH-20-11009	Idrayani Vishnu More	Chandrapur	28.389%
GKEMPLPH-20-9208	Govardhan Vishvnath Ghogare	Nagpur	28.443%
GKEMPLPH-20-5120	Sanjay Bhimrao Wakale	Akola	28.455%
GKEMPLPH-20-1387	Sundarrao Asaram Yadav	Parbhani	28.481%
GKEMPLPH-20-4072	Kondji Chanpatrao Bokhare	Latur	28.486%
GKEMPLPH-20-5962	Vasant Asaram Korde	Washim	28.496%
GKEMPLPH-20-8728	Uttam Sambhaji Jarande	Wardha	28.541%
GKEMPLPH-20-11301	Asha Vitthal Bhurbhure	Gadchiroli	28.558%
GKEMPLPH-20-684	Vishnu Ramkisan Jadhav	Jalna	28.566%
GKEMPLPH-20-9537	Omkar Ramrao Jogadand	Nagpur	28.581%
GKEMPLPH-20-1045	Shamuvel Baburao Gudhekar	Parbhani	28.607%
GKEMPLPH-20-6806	Tukaram Sadoji Ghodage	Amravati	28.643%
GKEMPLPH-20-10112	Prayagabai Ganeshrao Magar	Bhandara	28.666%
GKEMPLPH-20-8078	Quadri Syed Azmat	Yavatmal	28.716%
GKEMPLPH-20-4813	Bhaskar Vajinathrao Kale	Buldhana	28.722%
GKEMPLPH-20-464	Gangaprasad Shivdas Marde	Aurangabad	28.730%
GKEMPLPH-20-10094	Sarwatibai Uttamrao Kadam	Bhandara	28.733%
GKEMPLPH-20-736	Rameshwar Vikramji Tambile	Jalna	28.740%
GKEMPLPH-20-6562	Raghunath Narsingrao Londhe	Washim	28.745%
GKEMPLPH-20-11582	Keshav Madhavrao Ghuge	Gadchiroli	28.748%
GKEMPLPH-20-3240	Kailas Shrirang Sawandkar	Osmanabad	28.758%
GKEMPLPH-20-11288	Baliram Satwa Mudhol	Chandrapur	28.779%

Third party assessment for monitoring period – Year 2			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-8651	Abhiman Aashruba Sonsale	Wardha	28.790%
GKEMPLPH-20-13062	Ram Eknath Shinde	Gadchiroli	28.812%
GKEMPLPH-20-2479	Dnyaneshwar Vishwanath Mudhol	Nanded	28.839%
GKEMPLPH-20-4422	Vaijanath Samgir Gire	Latur	28.907%
GKEMPLPH-20-5297	Kamlabai Vitthalrav Dhotare	Akola	28.919%
GKEMPLPH-20-2231	Kanta Sadashiv Zade	Beed	28.931%
GKEMPLPH-20-2600	Nandabai Madanrao Shinde	Nanded	28.950%
GKEMPLPH-20-6690	Sitaram Narayan Kakde	Amravati	28.973%
GKEMPLPH-20-3382	Sheshabai Ranganath Karhale	Osmanabad	29.036%
GKEMPLPH-20-1650	Gajanan Shesherao Sable	Hingoli	29.108%
GKEMPLPH-20-4636	Krushna Maroti Korade	Buldhana	29.220%
GKEMPLPH-20-13577	Ramrao Wamanrao Napte	Gondia	29.601%
GKEMPLPH-20-14287	Satish Madhavrao Bothikar	Gondia	30.041%
GKEMPLPH-20-12064	Hanuman Rambhau Junghare	Gadchiroli	30.374%

Third party assessment for monitoring period – Year 3			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-1610	Ashabai Shravan Manavate	Hingoli	27.007%
GKEMPLPH-20-9997	Vishwanath Nagorao Nagare	Bhandara	27.020%
GKEMPLPH-20-7059	Mahadeo Ganesh Rajbinde	Amravati	27.022%
GKEMPLPH-20-2741	Sitabai Nagorao Sawale	Nanded	27.056%
GKEMPLPH-20-5547	Satyabhama Maroti Bharti	Akola	27.105%
GKEMPLPH-20-8972	Namdev Dhondiba Korde	Wardha	27.146%
GKEMPLPH-20-13683	Urmila Pandita Limbule	Gondia	27.165%
GKEMPLPH-20-7784	Prabhakar Mariti Mukhamhale	Yavatmal	27.225%
GKEMPLPH-20-1588	Shakuntalabai Babarao Devde	Hingoli	27.238%
GKEMPLPH-20-2229	Dashrat Dattarao Ghuge	Beed	27.314%
GKEMPLPH-20-1262	Datta Sakharam Shinde	Parbhani	27.348%
GKEMPLPH-20-11941	Pralhad Piraji Ingole	Gadchiroli	27.360%
GKEMPLPH-20-11809	Nyanoba Bhaurao Kale	Gadchiroli	27.372%
GKEMPLPH-20-2011	Parasram Dattrao Gugale	Beed	27.398%
GKEMPLPH-20-10871	Waman Khanduji Hembade	Chandrapur	27.476%
GKEMPLPH-20-671	Yusuf Kha Pathan	Jalna	27.480%
GKEMPLPH-20-9755	Kishanrao Bhikaji Dakhore	Nagpur	27.507%
GKEMPLPH-20-4219	Dharmraj Baburao Gadade	Latur	27.583%
GKEMPLPH-20-5599	Pralhad Arjuna Tanpure	Akola	27.615%
GKEMPLPH-20-8831	Maroti Narayan Kangane	Wardha	27.641%
GKEMPLPH-20-3303	Narayan Jalba Panchal	Osmanabad	27.652%
GKEMPLPH-20-2542	Manikrao Kishanrao Aher	Nanded	27.658%
GKEMPLPH-20-10810	Latabai Sudhakar Sapate	Chandrapur	27.674%
GKEMPLPH-20-6595	Rukhamin Gajanan Kurdhane	Washim	27.692%
GKEMPLPH-20-5085	Narayan Vitthalrao More	Buldhana	27.717%
GKEMPLPH-20-6717	Laxmanrao Sonaji Khandre	Amravati	27.799%
GKEMPLPH-20-12482	Savita Mukesh Adhe	Gadchiroli	27.848%
GKEMPLPH-20-9766	Vasant Gema Jadhav	Nagpur	27.901%
GKEMPLPH-20-11488	Parmeshwar Ramnarayan Giram	Gadchiroli	28.036%
GKEMPLPH-20-13454	Janabai Lodu Lokhande	Gondia	28.168%

Third party assessment for monitoring period – Year 3			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-12068	Ashok Marotrao Sontakke	Gadchiroli	28.173%
GKEMPLPH-20-6493	Balasaheb Prakashrao Kadam	Washim	28.185%
GKEMPLPH-20-10653	Sumiti Vitthalrao Bhavar	Bhandara	28.234%
GKEMPLPH-20-4491	Laxman Marotrao Yadav	Latur	28.244%
GKEMPLPH-20-8259	Parvatibai Shivraj Mahajan	Yavatmal	28.245%
GKEMPLPH-20-112	Ananta Bhimrao Kadam	Aurangabad	28.325%
GKEMPLPH-20-691	Bandu Purbhaji Kotkar	Jalna	28.509%
GKEMPLPH-20-4851	Sahebrao Babarao Sable	Buldhana	28.634%
GKEMPLPH-20-3336	Purabhaji Pundalik Vanakhede	Osmanabad	28.804%
GKEMPLPH-20-1350	Mukesh Balchand Jain	Parbhani	28.851%

Third party assessment for monitoring period – Year 4			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-1369	Narayan Nagoba Sonvane	Parbhani	27.019%
GKEMPLPH-20-10918	Mahesh Angad Sable	Chandrapur	27.101%
GKEMPLPH-20-4132	Sakharam `Tukaram Davale	Latur	27.116%
GKEMPLPH-20-13001	Gorakhanath Sitaram Kokane	Gadchiroli	27.225%
GKEMPLPH-20-9882	Sambhaji Shamrao Burkule	Bhandara	27.229%
GKEMPLPH-20-8377	Dadarao Devrao More	Yavatmal	27.233%
GKEMPLPH-20-898	Namdev Jayaji Jadhav	Jalna	27.241%
GKEMPLPH-20-3387	Rajabhau Baburao Taur	Osmanabad	27.258%
GKEMPLPH-20-1025	Virendrasingh Dhondusingh Bayas	Parbhani	27.259%
GKEMPLPH-20-2571	Ravikumar Ramdas Shinde	Nanded	27.292%
GKEMPLPH-20-2115	Mubin Khan Pathan	Beed	27.318%
GKEMPLPH-20-1502	Ganapat Shrirang Rajurkar	Hingoli	27.328%
GKEMPLPH-20-8183	Shivaji Ankush Khapare	Yavatmal	27.369%
GKEMPLPH-20-5500	Kalabai Khobraji Bokhare	Akola	27.375%
GKEMPLPH-20-1928	Dasrao Shripatrao Kshirasagar	Hingoli	27.379%
GKEMPLPH-20-9759	Rangnath Tatyrao Keware	Nagpur	27.387%
GKEMPLPH-20-2732	Sainath Shrikisan Anande	Nanded	27.440%
GKEMPLPH-20-12789	Balkishan Bhaurao Pashte	Gadchiroli	27.490%
GKEMPLPH-20-13699	Bharatrao Uattamrao Pund	Gondia	27.502%
GKEMPLPH-20-6294	Kamal Datta Shelake	Washim	27.510%
GKEMPLPH-20-12196	Bhaskar Ramrao Bengal	Gadchiroli	27.513%
GKEMPLPH-20-4780	Sambhaji Dattarao Dalvi	Buldhana	27.517%
GKEMPLPH-20-7454	Shankar Kundlik Wable	Amravati	27.525%
GKEMPLPH-20-13720	Shriram Yankoji Pawar	Gondia	27.559%
GKEMPLPH-20-8779	Digambar Datta Vyavhare	Wardha	27.570%
GKEMPLPH-20-10823	Shantabai Dattarao Bobade	Chandrapur	27.715%
GKEMPLPH-20-3625	Vishwanath Khanduji Khodke	Osmanabad	27.717%
GKEMPLPH-20-13283	Dhanaji Arjun Bhagat	Gadchiroli	27.789%
GKEMPLPH-20-5882	Vasanta Sambhaji Mirase	Washim	27.802%
GKEMPLPH-20-4194	Parmeshwar Madhukar Jadhav	Latur	27.877%
GKEMPLPH-20-4564	Anita Ashokrao Kale	Buldhana	27.924%
GKEMPLPH-20-7522	Digambar Vishwanath Adkine	Amravati	28.190%
GKEMPLPH-20-10373	Bebitai Maroti Pandav	Bhandara	28.232%

Third party assessment for monitoring period – Year 4			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-745	Nagorao Ravaji Gundle	Jalna	28.302%
GKEMPLPH-20-9059	Arjun Lahu Rathod	Wardha	28.331%
GKEMPLPH-20-9256	Prabhavati Govardhan Jadhav	Nagpur	28.577%
GKEMPLPH-20-14	Sanjay Devrao Kale	Aurangabad	28.657%
GKEMPLPH-20-5316	Ananta Pandhrinath Solanke	Akola	28.693%
GKEMPLPH-20-12836	Shankar Devrao Karhale	Gadchiroli	28.839%
GKEMPLPH-20-2098	Parvati Mahadev Anande	Beed	29.040%

Third party assessment for monitoring period – Year 5			
Identification number	Beneficiary name	District	Tested Efficiency
GKEMPLPH-20-583	Vilas Sudamrao Vanje	Jalna	26.022%
GKEMPLPH-20-3875	Sangita Rajendra Bharti	Latur	26.110%
GKEMPLPH-20-12312	Devidas Narayan Dhangale	Gadchiroli	26.192%
GKEMPLPH-20-4714	Rukhamin Ashok Aardad	Buldhana	26.199%
GKEMPLPH-20-12505	Nandkishor Vishwanath Londhe	Gadchiroli	26.214%
GKEMPLPH-20-9515	Sudhakar Rambhau Tarvate	Nagpur	26.236%
GKEMPLPH-20-12749	Rajabai Subhasharao Pund	Gadchiroli	26.256%
GKEMPLPH-20-7452	Madan Nivrutti Paikrao	Amravati	26.263%
GKEMPLPH-20-11416	Sangita Kashinath Sarang	Gadchiroli	26.288%
GKEMPLPH-20-5698	Jayashri Shivaji Shinde	Washim	26.323%
GKEMPLPH-20-8247	Prakash Sarjerao Bidwe	Yavatmal	26.337%
GKEMPLPH-20-14117	Pradip Vamanrao Gore	Gondia	26.402%
GKEMPLPH-20-375	Mahesh Pujaram Pawar	Aurangabad	26.417%
GKEMPLPH-20-2151	Anil Devidas Chandravanshi	Beed	26.457%
GKEMPLPH-20-13349	Devrao Dasharath Sangale	Gondia	26.545%
GKEMPLPH-20-9547	Kusumbai Gulabrao Dahibhate	Nagpur	26.554%
GKEMPLPH-20-7853	Reshmaji Vishwanath Jadhav	Yavatmal	26.586%
GKEMPLPH-20-5181	Dattrao Tukaram Renge	Akola	26.637%
GKEMPLPH-20-2712	Sudamati Haribhau Bhendekar	Nanded	26.693%
GKEMPLPH-20-3583	Ganesh Munjaji Tompe	Osmanabad	26.702%
GKEMPLPH-20-9085	Shankrao Dagdoji Kadam	Wardha	26.713%
GKEMPLPH-20-6282	Gayabai Purbhaji Jadhav	Washim	26.746%
GKEMPLPH-20-6796	Shivnanda Ramrao Magar	Amravati	26.796%
GKEMPLPH-20-10883	Aruna Masaji More	Chandrapur	26.814%
GKEMPLPH-20-12423	Sudhir Vishnudas Ardad	Gadchiroli	26.822%
GKEMPLPH-20-10549	Gorakhnath Tukaram Vasmatar	Bhandara	26.856%
GKEMPLPH-20-1373	Ranjit Janardhan More56	Parbhani	26.962%
GKEMPLPH-20-5512	Vaijanath Sitaram Gite	Akola	27.051%
GKEMPLPH-20-11182	Rangarao Madhavrao Hodgir	Chandrapur	27.067%
GKEMPLPH-20-565	Keshav Dattarao Khatal	Jalna	27.122%
GKEMPLPH-20-3850	Yashodabai Bajirao Mate	Latur	27.200%
GKEMPLPH-20-2800	Shailabai Eaknath Markad	Nanded	27.338%
GKEMPLPH-20-3105	Chatrabhuj Ravsaheb Tupe	Osmanabad	27.394%
GKEMPLPH-20-2031	Laxman Shankar Raut	Beed	27.441%
GKEMPLPH-20-1880	Dadasaheb Sopanrao Waghmare	Hingoli	27.509%

GKEMPLPH-20-4590	Nitin Shashikant Ghuge	Buldhana	27.625%
GKEMPLPH-20-10647	Sathyabhama Ramrao Shelke	Bhandara	27.679%
GKEMPLPH-20-922	Ambadas Keshav Binwade	Parbhani	27.705%
GKEMPLPH-20-1697	Ganesh Maruti Raut	Hingoli	27.847%
GKEMPLPH-20-8869	Laxman Khandoji Dube	Wardha	27.864%

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 14,300 Nos. cook stove distributed is 677 tCO₂e /year.

The leakage emissions achieved for this monitoring period is 3.240 tCO₂e /year.

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)
07-Oct-2012 - 06- Oct -2013	11,505	0	576	10,929
07- Oct -2013 - 06- Oct -2014	14,100	0	706	13,394
07- Oct -2014 - 06- Oct -2015	13,430	0	672	12,758
07- Oct -2015 - 06- Oct -2016	13,167	0	659	12,508
07- Oct -2016 - 06- Oct -2017	12,523	0	627	11,896
Total	64,725	0	3,240	61,485

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
07- Oct -2016 - 06- Oct - 2017	61,485	64275	-4.54%