

**Gold standard for the global goals
Monitoring report**



June 2017, version 1

Title of the project	Improved Woodstoves in Udaipur - Helping Women and Environment								
Gold Standard project id	GS1021								
Version number of the monitoring report	02								
Completion date of the monitoring report	10/10/2019								
Date of project design certification	Version 5, dated 02/01/2018 – Design Change Approval								
Start date of crediting period	01/01/2016 – 31/12/2025								
Duration of this monitoring period	01/10/2017 to 31/07/2019 (Inclusive of both days)								
Duration of previous monitoring period	01/01/2016 to 30/09/2017								
Project representative(s)	Udaipur Urja Initiatives Producer Company Limited								
Host Country	India								
Certification pathway (activity certification/impact certification)	Impact Certification – GS VERs								
SDG Contributions targeted (as per approved PDD)	This is based on Version 2.2 and the SDG contributions are listed in section E.3								
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	Impact Certification for GS VERs based on version 2.2								
Selected methodology(ies)	AMS II.G. Energy efficiency measures in thermal applications of non-renewable biomass, Version 3, EB 60.								
Estimated amount of annual average certified SDG impact (as per approved PDD)	75,954 tCO ₂								
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	<table border="1"> <tr> <td>2017 (Oct-Dec 2017)</td><td>10,078 tCO₂</td></tr> <tr> <td>2018 (Jan-Dec 2018)</td><td>38,917 tCO₂</td></tr> <tr> <td>2019 (Jan-July 2019)</td><td>20,341 tCO₂</td></tr> <tr> <td>Total</td><td>69,336 tCO₂</td></tr> </table>	2017 (Oct-Dec 2017)	10,078 tCO ₂	2018 (Jan-Dec 2018)	38,917 tCO ₂	2019 (Jan-July 2019)	20,341 tCO ₂	Total	69,336 tCO₂
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SECTION A. Description of project

A.1. Purpose and general description of project

>> (Provide a brief summary of the detailed description given in section B.1 including purpose of the project, brief description of the installed technology and equipment and relevant dates for the project (e.g. construction start/end, commissioning, continued operation periods, etc.)

The GS1021 – “Improved Woodstoves in Udaipur - Helping Women and Environment” project was registered as a GS CDM project. The project was voluntarily de-registered with the UNFCCC and registered as a GS VER project with the Gold Standard. Udaipur Urja Initiatives (UUI) Producer Co. Ltd. the PP of the project helps provide access to appropriate technologies and to market agro-produces for the rural communities. UUI currently works with communities of Udaipur district. UUI is a membership-based entity, in which membership is by the purchase of a share. All the households with ICS in the project activity are members of the Producer Company. Along with cook stoves, the enterprise is building activities on solar lights and trading of agriculture produces grown by its members and other families in the region, thereby bettering the lives of rural communities.

Purpose of the project activity

The purpose of the project activity is to decrease fuel wood consumption by replacing inefficient traditional cook stoves in 18,500 households with efficient fuel wood single pan GREENWAY JUMBO STOVE and GREENWAY SMART cook stoves, in a drought prone, biomass deficient region of India. Based on average thermal efficiency improvement of Greenway Jumbo and Greenway smart stove, each household saves about 2.19 t/year, while in the baseline, the consumption is 3.21 t/household/yr. The savings over the baseline fuel wood consumption is 68.22%. By reducing fuel wood consumption, the project activity reduces greenhouse gas (GHG) emissions stemming from the use of non-renewable biomass. The ICS cook stoves saves about 2.35 t of CO₂/yr/family in this region, alongside providing smoke free environment at home and reducing drudgery for collection of fuelwood. This is the second verification report. The distribution of 18,500 ICS were done during the previous monitoring period. During this second monitoring period, monitoring of the use of these stoves and their repair and maintenance was done to ensure maximum use of the stoves.

A.2. Location of project

>> (Provide host country, state/province, city/town details along with GPS co-ordinates.)

Country: INDIA

State: Rajasthan

District: Udaipur

Taluks: All Tehsils of Udaipur

Udaipur district is located between 23° 46' and 25° 05' North latitude and 73° 09' and 74° 35' East longitude covering an area of 11,630.66 sq. km. Administratively, the district is divided into 11 Tehsils¹. The region is a semi-arid zone with an average annual rainfall of about 650 mm, which is mainly received during monsoon season from July to September. Aravalli hill ranges from north to south surround the area. The topography of the area is medium to high rocky hills, contours and plains.

¹ <http://rajcensus.gov.in/admin.html>



Figure 1: Project Location - Rajasthan State and Udaipur District

A.3. Reference of applied methodology

>> (Indicate title and version number of the methodology.)

Sectoral Scope – 3; Energy Demand

Project Type II - ENERGY EFFICIENCY IMPROVEMENT PROJECTS

Project Category – II.G. Energy efficiency measures in thermal applications of non-renewable biomass, Version 3, EB 60.

A.4. Crediting period of project

>> (Provide start date and length of the crediting period as given in approved PDD.)

Fixed Crediting Period

Start date of crediting period – 01/01/2016

Duration of crediting period: 10 Years

Crediting Period: 01/01/2016 – 31/12/2025

SECTION B. Implementation of project

B.1. Description of implemented project

>> (Provide information on the implementation status of the project during this monitoring period. Specify any deviations / delays compared to information in approved project.)

a) Implementation status of the project activity:

The project was registered with the Gold Standard as a GS VER project after transitioning from GS CDM Project. The first ERPA was signed in October 2015 with the carbon revenue, after which orders were placed with Greenway Grameen Infra Pvt. Ltd. for Greenway Smart and Greenway Jumbo stoves. Hence, the project was implemented after the project was registered and carbon forward funding was obtained for implementation of the project. Two ICSs were given to each of the participating households, one each of Greenway Smart and Greenway Jumbo Stove. The ICS were distributed for 19 months in a phased manner as follows, which was during the previous monitoring period, i.e. the first monitoring period.

Table 1: Phased distribution of ICS under the project activity

Year	Month of distribution	Number of Households
2016	Jan 2016	236
	Feb 2016	570
	March 2016	256
	April 2016	474
	May 2016	1227
	June 2016	962
	July 2016	1152
	Aug 2016	903
	Sept 2016	1494
	Oct 2016	1928
	Nov 2016	1308
	Dec 2016	988
2017	Jan 2017	1201
	Feb 2017	1255
	March 2017	1585
	April 2017	2087
	May 2017	610
	June 2017	209
	July 2017	55
Grand Total		18,500

The ICS was distributed in 5 sub-districts, 282 villages and 18,500 rural households as follows:

Table 2: Number of sub-districts, villages and households of the project activity

Sub-District	Number of Villages	Number of Households
Girwa	55	2,715
Jhadol	72	3,927
Kherwara	100	8,193
Rishabhdeo	49	3,269
Sarada	6	396
Grand Total	282	18,500

Table 3: Number of ICS distributed village-wise in the project location

Sub-District	Village	Number of Households
GIRWA	Aad	45
	Alsigarh	200
	Amarpura	64
	Bachar	9
	Bara	51
	Barapal	5
	Bemala	1
	Besla	1
	Bhagalaghat[Bara]	20
	Bhalawato Ka Guda	15
	Bhekada [Ramaj]	18
	Borikua	94
	Budal	25
	Chanavada	194

	Chandni	15
	Choti Undari	24
	Daban	66
	Devada	30
	Dodavali	26
	Futeda	1
	Gojiya	42
	Gorana	1
	Goyara	8
	Hailikui	59
	Jhabla	76
	Kalivali	35
	Kaliwas	45
	Kanpur	124
	Kaya	70
	Keli	35
	Khateliya[Suro Ka Guda]	23
	Kitoda	49
	Kumbariya Kheda	2
	Lalpura	13
	Mor Dungri	75
	Nala Bhadawat	28
	Nala Jhabla	35
	Nangela	70
	Nichla Jhabla	2
	Paba	18
	Padtal	21
	Paduna	191
	Pai	18
	Patiya (Girwa)	100
	Pipalvas	25
	Popalti	50
	Ramaj	40
	Rava	123
	Rayata	7
	Saru	254
	Sarupal	66
	Savariya Kheda	20
	Tariba	19
	Tidi Khara	21
	Toran Talab	46
GIRWA Total		2,715
JHADOL	Aamaliya	77
	Aamleta	82
	Aamod	52
	Adakaliya	34
	Bada Bhilwada	76
	Badlipada	94

	Badoliya	61
	Balvi	37
	Bansivada	38
	Bari	10
	Bassi	41
	Beechhiwada	1
	Bhamti	102
	Bijali	44
	Birothi	58
	Chhota Bhilwada	34
	Dagol	58
	Damana	20
	Dhala	84
	Dhartidevi	65
	Dob	34
	Dolriya	8
	Futagarh	44
	Garanwas	192
	Ghodimari	13
	Godawada	75
	Goran	31
	Jagannathpura	14
	Jamun	95
	Jekada	50
	Jhalampura	16
	Jhanjhar Ki Pal	40
	Kankarmala	69
	Karel	290
	Kharadiya	6
	Khati Kamdi	51
	Kherad	1
	Koliyari	2
	Kwadar	50
	Liladi	33
	Madla	64
	Madri	141
	Makdadev	17
	Melyana Khurd	2
	Mundkosiya	18
	Nalachota	15
	Naya Khola	9
	Nayagaon	1
	Nenbara	85
	Nevaj	41
	Nichli Sigri	179
	Oda	100
	Pargiapada	49
	Patiya (Jhadol)	135

	Phalasiya	106
	Pipalbara	43
	Richawar	29
	Rohimala	37
	Rop	14
	Sada	124
	Sarvali	17
	Selana	34
	Sera	60
	Shyampura Kala	15
	Som	104
	Sultan Ji Ka Kherwada	60
	Suvali	43
	Thobawada	38
	Tumdar	2
	Umariya	45
	Upareta	26
	Upli Sigri	92
JHADOL Total		3,927
Kherwara	Aadaghar	8
	Asariwada	109
	Babri	94
	Badla	66
	Balat	4
	Balicha	313
	Bambala	18
	Banjariya	95
	Barothi Brahmanan	77
	Bawalwada	21
	Beda	85
	Bhagorpada	105
	Bhakhra	157
	Bhalai	5
	Bhanada	116
	Bhanva	81
	Bhataki	90
	Bhatdiya	22
	Bhervi	25
	Bhomtawada	14
	Boslati	116
	Chikalwas	51
	Chikli	51
	Chittoda	184
	Dabaycha	3
	Daiyawada	4
	Damorwada	126
	Dechar	2
	Demat	133

	Deonal	31
	Dheekwas	49
	Gaduniya	63
	Ganganagar	100
	Garaja	55
	Gathiya	43
	Gatrali	93
	Ghati	111
	Gogharwada	100
	Gohawada	32
	Guda	149
	Harshawada	94
	Itva	44
	Jambuda (Dhara)	1
	Jawas	37
	Jhanjri	202
	Jhunthri	374
	Juvarava	69
	Kadiyanala	165
	Kakradungra	116
	Kanbai	133
	Kanpur Patiya	3
	Karawada	143
	Karmala	59
	Karnauva	1
	Katar	125
	Katvi	154
	Khandi Obri	156
	Kharadiwada	99
	Kharcha	50
	Khedaghati	119
	Kherwada	1
	Khetiyala	36
	Khunadari	1
	Khuntwada	66
	Lakoda	50
	Lambapanwa	62
	Larathi	177
	Magra	137
	Mahudiya	1
	Mahuwal Magra	55
	Malifala	8
	Modiwasa	65
	Navaghara	7
	Nichla Talab	258
	Pahada	267
	Paliya	39
	Patia(Kherwara)	1

	Rachha	22
	Rajnagar	137
	Ranawada	69
	Rani	34
	Rehta	7
	Rel	1
	Retda	42
	Robiya	69
	Saklail	1
	Samited	114
	Samlai Panwa	107
	Saredi	105
	Sarera	1
	Saroli	152
	Satsagda	108
	Subedra	74
	Sulai	317
	Suveri	171
	Thana	1
	Upla Badla	3
	Vanibor	228
	Vav	32
	Vavai	22
Kherwara Total		8,193
Rishabhdeo	Aamba	55
	Amarpura	7
	Bamanwada	4
	Barna	51
	Bhagor	2
	Bhalun	62
	Bhalun Guda	1
	Bhauva	27
	Bhudhar	77
	Bichiwada	80
	Bori	68
	Chorai	97
	Dama Talab	236
	Depur	85
	Dhelana	58
	Dolpura	133
	Futala	46
	Garnala	13
	Ghodasar	68
	Ghodiawada	39
	Gumanpura	117
	Jalpaka	97
	Kakan	130
	Kalyanpur	69

	Kandal	50
	Karji	69
	Katev	78
	Kesharpura	4
	Khakariya	1
	Kojawada	284
	Maal	75
	Macharon Ki Ubri	111
	Magra (Sagwada)	52
	Mahuwada	8
	Nichala Mandava	58
	Nichli Katev	14
	Oadwas	6
	Paderi	26
	Pahada	68
	Panchapadla	10
	Pand yawada	1
	Pareda	216
	Rajol	99
	Rama Bavadi	68
	Sagwada	97
	Samret	8
	Shyampura	51
	Upla Mandava	39
	Vali [Kunda]	154
Rishabhdeo Total		3,269
SARADA	Batuka	40
	Bhorai	27
	Kharbar	30
	Krishnapura	276
	Neva Talai	20
	Shinghatwada	3
SARADA Total		396
Grand Total		18,500

All the stoves were distributed during the previous monitoring period. During this monitoring period, only monitoring, repair and maintenance of stoves was done for maximum use of the stoves.

A GS VER Team is in place to facilitate the implementation and monitoring of the project. Following is the monitoring strategy that is followed to ensure that the usage of the ICS is maximized and that the project's carbon emission reduction target is achieved.

I. Project Team

The project team comprises of the following members:

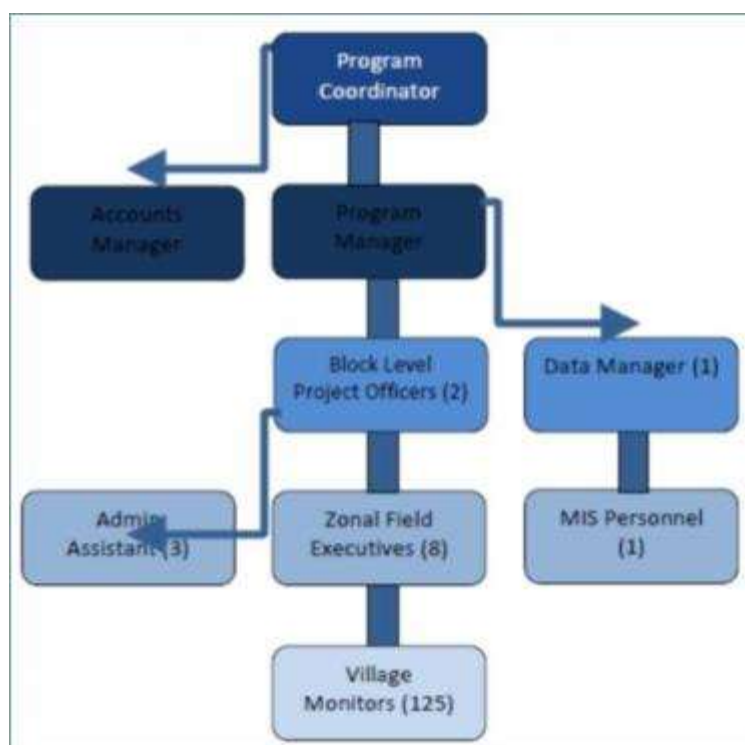


Figure 2: Project Team of UUI for the project activity

- (a) **GS VER Program Coordinator:** One coordinator is assigned to work at the organization headquarter and administers the following tasks:
- Coordinate and monitor overall implementation of all activities of the project, ensuring that the carbon emission reduction targets are met and defined sustainable development indicators are fulfilled.
 - Communicate and liaison with the CDM consultants, DoE and the buyers.
 - Prepare regular progress updates for the organization's management and board, and the buyers.
 - Fulfil all legal and accounting needs of the project.
- (b) **Project Manager:** This person is based at the organisation headquarter and is responsible for the following:
- Coordination of field implementation of the project ensuring efficient supply of ICS, maintaining inventory and approval for replacements.
 - Supervise maintenance team, and ensure that repairs and replacements are done on time for minimal down time.
 - Monitor the data entry of Improved Cook Stove usage/supervise the app based entry of household records, and generate progress reports from the digitized monitoring system.
 - Discuss progress results with the project team to identify problems/ good practices, and incorporate them in execution/ monitoring strategy. Share the village/ zone specific problems in their respective monthly meetings.
 - Conduct random checks personally and coordinate the audit team.
 - Coordinate with the ICS stove repairer and ensure that all repair and replacement information is fed into the digitized system.
 - Assist Zonal team to resolve conflicts, when required.
 - Organize periodic trainings for village level monitoring system project team and village committees on CC issues.
 - Ensure completion of all accounting requirements regarding the project.
- (c) **Project Officers :** Two project assistants are appointed at the block level to manage following tasks:
- Assist the zonal team to resolve their issues on data entry and usage of software.

- Coordinate with the software provider for updates and technical issues.
- Assist the project officer in activities like inventory maintenance and accounting.
- Be a part of the Audit team and supervise data entry.

(d) Zone Field Executives: Eight zone workers are appointed and their responsibilities include:

- Effective field implementation of the project, efficient supply of ICS, maintains inventory, approval, and facilitation of replacements on a zonal level.
- Supervise maintenance team, and ensure that repairs and replacements are done on time for minimal down time.
- Undertake/ monitor data entry of ICS usage from the household records collected.
- Discuss progress results with the village level monitoring system in monthly meetings.
- Conduct random checks as part of the audit team.
- Facilitate dialogue of village institutions with households not adhering to the agreed terms.
- Assist village level monitoring systems and institutions to resolve conflicts, if any arise.

(e) Village Monitors: The monitoring data collection at the household level is done by Village Representatives selected from different sources, depending on UUI's activities and reach in the villages. One representative is assigned to a cluster of 80 to 120 households. Their responsibilities include:

- Recording the data of non-usage and its reasons for each household on a monthly basis.
- In case of damaged ICS, undertake minor repair if possible or inform the zone worker for a replacement.
- Provide monthly data to the zone workers for consolidation.
- Have dialogue with households not adhering to the agreed terms, and if not able to resolve, inform the village institution.
- Facilitate village institutions to resolve conflicts, if any.
- Many of the village monitors were trained to enter the collected data to a smart phone app. Nearly 90% of the village volunteers use mobile app to enter the data, which is uploaded to the cloud.

A repair workshop is established at Kherwada for repair and maintenance of all the distributed stoves. The company Greenway has trained a local person for repair of the stoves. Hence, all the stoves are now repaired in Udaipur and need not be sent to the company for repair and maintenance. This has provided additional employment.

II. Governance

The governance of the project is undertaken by the Gram Vikas Samiti² of the villages. These democratically elected committees manage village funds, provide leadership and manage a variety of local development activities. These include convening village meetings, monitoring and evaluating on-going development works, making payments to village level volunteers and facilitating interaction with the formal government bodies. Their tasks for this project include:

- Organise village meetings for awareness about the project,
- Identify distributor and monitor for ICS distribution and monitoring of usage.
- Act as an interface between the project team and ICS users.
- Dialogue with the households not adhering with the terms of end users agreement, and resolve the conflicts if any.
- Assist in identifying new households in the case of drop-outs due to the migration or non-adherence.
- Undertake random checks with the village level monitoring system and project staff.

² Gram Samuh is a community-based institution formed by Seva Mandir in project villages. The institution is a membership-based organisation, which has an elected committee named Gram Vikas Samiti (Village Development Committee) to supervise the implementation and monitoring of all development activities undertaken in their community.

III. Monitoring Strategy

The monitoring strategy is focused on the two main monitoring requirements: tracking usage of Improved Cook Stove and tracking slippage to old traditional mud/brick cook stoves.

Tracking usage of Improved Cook Stoves: This primarily means tracking that the given ICS are being used regularly by the participating households. The monitoring of the usage is done through following process:

- The village level volunteers collect the information from the families directly and record it in their monitoring books to be transferred to the monitoring sheet. Now most of the village level volunteers have migrated to app-based recording, which is installed on their smart phones.
- At village level, the respective village level monitoring system conducts monthly visits and meetings, depending on the monitoring requirements of households. The records collected are entered in the app which is directly uploaded to a cloud based database or monitoring sheet once a month by the zone workers or village monitors. The entered data is collated at the block by the project assistant to record the data in Microsoft Excel Sheets or Google Sheets. Many of the village level volunteers enter the data on their smart phone app directly. UUI developed the app and trained the village level volunteers to use the app on their smart phone.

Tracking non-slippage to traditional stoves: Maintenance of improved stoves is an important aspect of ensuring non-slippage to old stoves. The monitoring strategy for non-slippage and the maintenance strategy in case of breakdown is as follows:

- A tripartite End User Agreement is signed between the user, Gram Vikas Samiti and Udaipur Urja Initiatives with all participating families on satisfactory use of the ICS. The agreement clearly defines roles and responsibilities of all three parties in terms of implementation and monitoring of the GS VER project.
- During the distribution meetings, the households were explained the significance of non-usage in terms of loss of ERs. They were asked to inform the village monitors or the zone worker in case of damage or non-functioning of ICS.
- During the household visits, meetings or otherwise, if any ICS is found not functioning or functioning improperly, the village monitors immediately inform the field executive for repair/temporary replacement. There have not been major damages till now, and moreover having two ICS, family does not need to shift on other stoves during damage.
- The Village level Volunteers undertake minor repairs. If the damage is due to a manufacturing defect or is not repairable by the maintenance team, the ICS is brought to the block office.
- The manufacturer has trained a team for repair and replacement of stoves. The stoves are now repaired at this workshop at Kherwada instead of sending them to the manufacturer for repairs.
- In case of a drop-out of a user, the ending date of ICS use is noted and recorded in the database. The drop-outs are replaced by other interested households using the traditional cook stove within the project boundary, so that the number of systems operating remains the same.

The data collected through the smart phone app is directly uploaded to the cloud based database or is entered on a monthly basis into Microsoft excel sheets directly.

B.2. Post-registration changes

B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

>> *(Indicate whether any temporary deviations have been applied during this monitoring period. If applied, provide a description of the deviation(s). Include the reasons for the deviation(s), how it deviates from the monitoring plan, applied methodology(ies) and/or applied approaches, the duration for which the deviation(s) is(are) applicable and justification on the conservativeness of the approach. Also indicate if prior approval from GS-TAC have been sought on the deviation.)*

There are no temporary deviations.

B.2.2. Corrections

>> *(Indicate whether any corrections to project information or parameters fixed at validation have been applied.)*

There are no corrections to project information or parameters fixed at registration.

B.2.3. Changes to start date of crediting period

>> *(Indicate whether any changes to the start date of the crediting period have been approved by Gold Standard that is relevant for this monitoring period.)*

The project was registered with the GS with a start date 21/01/2014. This has been postponed to 01/01/2016 as the implementation of the project was done in January 2016. The change to the start date of the crediting period was accepted by the Gold Standard through design change³.

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>> *(Indicate whether any permanent changes from the approved monitoring plan, applied methodologies or applied approaches have been approved by GS-TAC that is relevant for this monitoring period.)*

There are no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, or other applied standards or tools.

B.2.5. Changes to project design of approved project

>> *(Indicate whether any changes to the design of the project have been approved by GS-TAC that is relevant for this monitoring period.)*

There is no change in project design during this monitoring period.

Previously, the change in the project design as also mentioned in the PDD is as follows:

- The registered PDD, which was before implementation is with two models of cookstoves - Greenway Smart Stove and Chulika Aadi Sri Shakti. The project is being implemented with **Greenway Smart Stove** and **Greenway Jumbo Stove** after reviewing different models in the market in respect of local cooking needs and thermal efficiency. Hence the project is now implemented with 2 stoves per family, which is **Greenway Smart Stove** and **Greenway Jumbo Stove**.
- In the registered PDD, the project boundary was limited to 136 villages in 39 Gram Panchayats of Kherwara and Rishabhdev Tehsils of Udaipur District. The project boundary was expanded covering all Tehsils of Udaipur district under the design change⁴.

SECTION C. Description of monitoring system applied by the project

>>

According to AMS.II.G. Version 3:

Monitoring shall consist of checking the efficiency of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating at the specified efficiency (η_{new}) or

³ The approval date is 10 January 2018 and PDD version is Version 05 dated 2nd January 2018

⁴ The approved Version 4 of the PDD dated 5th December 2016

replaced by an equivalent in service appliance. Where replacements are made, monitoring shall also ensure that the efficiency of the new appliances is similar to the appliances being replaced. Monitoring shall also consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating or are replaced by an equivalent in service appliance.

- Monitoring consists of biennial check of ICS disseminated to determine the share of appliances that are still operating at the specified efficiency (η_{new}). Where appliances are found to be operational but with a changed efficiency, the actual efficiency determined in monitoring is applied to calculate emission reductions.
 - o As per the registered PDD, water Boiling Test was carried out biennially on representative samples using the standard testing protocol developed by PCIA. As soon as the stoves completed two years, two-year-old stoves were tested. The value obtained from the test was used to calculate the emission reductions of the systems for the years of operation till next tests will be conducted. Representative stoves for the vintage year was tested for determining the efficiency. Thus during the first two years, 31.17% for Greenway Jumbo Stove and 32.098% for Greenway Smart Stove was the efficiency applied; during the third year, the efficiency determined was applicable for 3rd and 4th year of operation.
 - o The scenarios for acceptable change in the efficiencies of ICS during the crediting period would be a lower efficiency of 25% (as fixed by MNRE to qualify as improved cook stoves) and higher efficiency of 31.17% for Greenway Jumbo Stove and 32.098% for Greenway Smart Stove. If the efficiencies are found to be lesser than 25%, emission reduction for a vintage, emission reduction will not be considered and the stoves will be replaced with higher efficiencies.
 - o The representative stoves were tested for a 95/5 precision (95% confidence interval and 5% margin of error). In cases where the result indicates that 95/5 precision is not achieved, the lower bound of a 95% confidence interval of the parameter value is chosen as an alternative to repeating the survey efforts to achieve the 95/5 precision.
- Monitoring also consist of checking of all the appliances to determine if they are still operating or replaced by an equivalent in service appliance.
 - o Where there is replacement of appliances, the replaced devices are considered with their related efficiency as applicable. If the appliance is replaced with a higher efficiency appliance, the same efficiency of the earlier appliance is considered, to be conservative.

Monitoring shall ensure that:

- (a) Either the replaced low efficiency appliances are disposed off and not used within the boundary or within the region; or
- (b) If the baseline stoves usage continues, monitoring shall ensure that the wood fuel consumption of those stoves is excluded from B_{old} in equation 2.

Regular monitoring by the village level monitors ensures that the wood fuel consumption of these baseline stoves is excluded from B_{old} .

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/parameter:	B_{old}
Unit	t/family/yr
Description	Quantity of woody biomass used in the absence of the project activity in tonnes

Source of data	Baseline Sample Survey conducted in the Project Area. This was further substantiated during the change in crediting period that the baseline fuelwood use continues.
Value(s) applied	3.21 t/family/yr
Choice of data or measurement methods and procedures	The fuel wood use was determined through a baseline survey conducted, which is described in Annex 3 of the PDD.
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period

Data/parameter:	$B_{y,savings}$
Unit	t/household/yr
Description	<i>Quantity of woody biomass that is saved in tonnes</i>
Source of data	Calculated
Value(s) applied	2.19 t/family/yr
Choice of data or measurement methods and procedures	Using the equation $B_{y,savings} = B_{old} \cdot (1 - \frac{\eta_{old}}{\eta_{new}})$ $B_{y,savings} = 3.21 \times (1 - \frac{0.10}{0.3163})$ $B_{y,savings} = 2.19 \text{ t/family/year}$ Thus $B_{y,savings}$ for the project is 2.19 t/family/yr
Purpose of data	To estimate emission reduction for the project activity
Additional comments	$\eta_{new} = 0.3117$ and 0.32098 for single pot of Greenway Jumbo stove and Greenway smart stove respectively, is based on WBT tests by accredited laboratory based on the Bureau of Indian standards (BIS) 13152: Biomass Chulha – Specification. For calculations η_{new} is considered as average of thermal efficiencies of both models (0.3117 and 0.32098) as two stoves are distributed per family; one of Greenway Jumbo and one of Greenway Smart stove. Actual woody biomass savings is determined based on number of each of the models (greenway jumbo stove and greenway smart stove) that is implemented. η_{new} is determined biennially based on the guidelines of the PCIA.

Data/parameter:	NCV biomass
Unit	TJ/tonne
Description	<i>Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)</i>
Source of data	IPCC
Value(s) applied	0.015
Choice of data or measurement methods and procedures	The net calorific value of woody biomass is as given in the methodology.
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period

Data/parameter:	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ

Description	<i>Emission factor for the substitution of non-renewable woody biomass by similar consumers.</i>
Source of data	II.G, Version 3 methodology
Value(s) applied)	81.6
Choice of data or measurement methods and procedures	As given in the methodology
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period

Data/parameter:	η_{old}
Unit	-
Description	<i>Efficiency of the baseline system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of systems are encountered;</i>
Source of data	II.G, Version 3 methodology
Value(s) applied)	0.10
Choice of data or measurement methods and procedures	According to the methodology, 0.10 default value may be optionally used if the replaced system is the three stone fire or a conventional system lacking improved combustion air supply mechanism and flue gas ventilation system i.e., without a grate as well as a chimney. The replaced systems in the project area is conventional system lacking improved combustion air supply mechanism and flue gas ventilation system.
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period

Data/parameter:	$f_{NRB,y}$
Unit	
Description	<i>Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass</i>
Source of data	Determined using nationally approved method using government data and data from peer reviewed journals and substantiated during the change in crediting period.
Value(s) applied)	0.88
Choice of data or measurement methods and procedures	Based on survey results, national and local statistics, studies, maps and other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area. Accordingly, the f_{NRB} is assessed at 0.88. Thus $f_{NRB} = 0.88$
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period

Data/parameter:	Diversion of non-renewable biomass saved under the project activity by non-project households
Unit	tonnes / hh/yr

Description	Diversion of non-renewable biomass saved under the project activity by non-project households
Source of data	Based on the methodology B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for leakages.
Value(s) applied)	0.11 t/HH/yr
Choice of data or measurement methods and procedures	According to II.G, Version 3, B_{old} can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.
Purpose of data	To estimate emission reduction for the project activity
Additional comments	This parameter is fixed for the entire crediting period. Surveys will not be conducted to determine leakage

D.2. Data and parameters monitored

Data/parameter:	No. of households in which ICS appliances will be used
Unit	Number
Description	Total Number of Households to which ICS appliances will be given to the beneficiaries after the project gets registered.
Measured/calculated/default	Measured
Source of data	Monitoring Database/ End User Agreements
Value(s) of monitored parameter	18,500
Monitoring equipment	There are no monitoring equipment for the project activity. - The number of households is determined based on number of each model with their specific efficiencies that is implemented. The total numbers of households are fixed so that the total energy savings is less than 180 GWh/year. -The ICS systems given to the beneficiaries are recorded in the monitoring database.
Measuring/reading/recording frequency:	Continuous
Calculation method (if applicable):	-The beneficiaries have signed an End User Agreement with Udaipur Urja Initiatives, in which the date of dissemination, the name of the user, the address, Village, Tehsil, District where the user is residing is noted, to irrefutably identify the user. -The ICS has an identification number (Appliance-ID) which is also noted in the End User Agreement. Udaipur Urja Initiatives maintains this database throughout the crediting period. -The database entries are made by the village monitors and zone workers appointed for this project. These entries are checked by Admin Assistant and are supervised by the Block Officers, Project Manager and Coordinator. -The database records and copies of the End User agreement are maintained at the Udaipur Urja Initiatives office in Udaipur and Kherwara. -The Coordinator checks on the End User Agreements. In case of inconsistencies, the assigned zone worker takes appropriate corrective actions.
QA/QC procedures:	The data is tallied with the time of stock arrival and dissemination.
Purpose of data:	To estimate emission reductions
Additional comments:	The VER calculations sheet has the details of the families using ICS under the project activity.

Data/parameter:	Start date of usage of appliances by the family
Unit	dd/mm/yy

Description	The start date of usage of ICS by each of the households.
Measured/calculated/default	Measured
Source of data	Monitoring Database, End User Agreement,
Value(s) of monitored parameter	Monitoring database of Udaipur Urja Initiatives. The submitted ER Calculation Sheet has the start date of usage for each of the family. No new families were added during this monitoring period.
Monitoring equipment	The start date of usage of each of the appliance is after satisfactory functioning of the ICS. This date is reflected in the end user agreement that is signed between Udaipur Urja Initiatives and the participating family and entered into the monitoring database of Udaipur Urja Initiatives.
Measuring/reading/recording frequency:	-For each ICS appliance that has been disseminated to the communities, the information is recorded in the End User Agreement and stored electronically in the monitoring database along with identification number of the appliance and the type. -The End User Agreement is signed with the Participating Family approximately after satisfactory functioning of ICS in their homes.
Calculation method (if applicable):	There are no calculation method applicable
QA/QC procedures:	Data from the End User Agreement is tallied with the time of stock arrival and dissemination. The data will be stored for the crediting period of the project activity and an additional two years.
Purpose of data:	To estimate emission reductions
Additional comments:	The date is the start date of use by the family.

Data/parameter:	η_{new}															
Unit	-															
Description	Efficiency of ICS															
Measured/calculated/default	Measured															
Source of data	Water Boiling Test carried biennially on representative samples using the standard testing protocol developed by PCIA. After two years, a two-year-old stove was tested. After four-years, four-year-old stoves will be tested. During this monitoring period, none of the stoves have completed 4 years of usage. The value obtained from the test was applied to calculate emission reductions of the systems that have completed 2 years.															
Value(s) of monitored parameter	<table><tr><th rowspan="2">Up to Period</th><th colspan="3">Applied Stove Efficiencies for Emission Reduction Calculations</th></tr><tr><th>Jumbo Greenway Stove</th><th>Smart Greenway Stove</th><th>Average</th></tr><tr><td>2 Years</td><td>31.167%</td><td>32.098%</td><td>0.3163</td></tr><tr><td>4 Years</td><td>28.524%</td><td>29.191%</td><td>0.2886</td></tr></table>	Up to Period	Applied Stove Efficiencies for Emission Reduction Calculations			Jumbo Greenway Stove	Smart Greenway Stove	Average	2 Years	31.167%	32.098%	0.3163	4 Years	28.524%	29.191%	0.2886
Up to Period	Applied Stove Efficiencies for Emission Reduction Calculations															
	Jumbo Greenway Stove	Smart Greenway Stove	Average													
2 Years	31.167%	32.098%	0.3163													
4 Years	28.524%	29.191%	0.2886													
Monitoring equipment	<p>The various equipment used for conducting the tests are thermocouple, scales, digital thermometer, timer, standard pots, metal fixture for holding thermocouple, small shovel, tongs, dust pan and metal tray.</p> <p>In addition, the WBT data calculation sheet provided by PCIA was used to calculate the efficiency of the stove based on the tests.</p>															
Measuring/reading/recording frequency:	Biennially															

Calculation method (if applicable):	Stoves that completed 2 years were tested for efficiency using PCIA guidelines. 3 stoves from each of the Tehsil were tested. Hence, 15 stoves were tested for each model of Smart and Jumbo stoves.
QA/QC procedures:	To confirm the quality, the efficiency of ICS appliance is measured by repeating the Water Boiling Test biennially of representative samples of Greenway Jumbo Stove and Greenway Smart Stove. Thus during the first two years, efficiency at the time of implementation (i.e. 31.17% for Greenway Jumbo and 32.098% for Greenway Smart Stove as supplied by the manufacturer) is the efficiency applied; during the third year, the efficiency determined is applicable for 3 rd and 4 th year of operation and so on. The scenarios for change in the efficiencies of ICS during the crediting period would be a lower efficiency of 25% and higher efficiency of 31.17% for Greenway Jumbo Stove and 32.098% for Greenway smart stove. The stoves are obtained from frequent users who use it at least 2 times a day. The mean value of the tests is taken. It is tested for 95/5 precision (95% confidence interval and 5% margin of error). In cases where the result indicates that 95/5 precision is not achieved, the lower bound of a 95% confidence interval of the parameter value is chosen as an alternative to repeating the survey efforts to achieve the 95/5 precision.
Purpose of data:	To estimate emission reductions
Additional comments:	

Data/parameter:	Non-usage of ICS
Unit	Days
Description	Usage of non-renewable biomass in case of non-performance of ICS
Measured/calculated/default	The days not used for each of the appliance is recorded by village monitors and are entered into the database.
Source of data	Dependent on the number of days ICS are under repair or not-used
Value(s) of monitored parameter	For each of the family, the days not used, which means the use of traditional stoves has been recorded and shown in the VER calculations sheet.
Monitoring equipment	As and when ICS is not functional, the beneficiaries report to the village monitor, who in turn informs the zone worker for repair of the unit. Even if the unit is not used as the family is not at home, it is recorded as non-usage of ICS. The details are recorded in the monitoring sheet, which is translated into use of traditional stoves and ERs not accounted for those days.
Measuring/reading/recording frequency:	The monitoring is done on continuous basis. The village volunteer visits the household once in a month to collect information of the days not used and the number of days of parallel traditional stove and LPG use and the type of food cooked on them. Emission Reductions are reduced for the non-functional days of the units and also for parallel and gas use of the type of food cooked.
Calculation method (if applicable):	There are no calculation methods. As data is collected from the field, it is entered into the database
QA/QC procedures:	The information is crosschecked by the Co-ordinator randomly for QA/QC procedures. In addition, random checks on field are done to corroborate the data collected.
Purpose of data:	To estimate emission reductions
Additional comments:	

Data/parameter:	Operation days of ICS
Unit	Number
Description	No. of days in a year ICS will be operational
Measured/calculated/default	Measured

Source of data	Monitoring database
Value(s) of monitored parameter	The operational days for each of the households are provided in the ER calculations sheet before deducting the non-operational days. The fuelwood use on traditional stoves is directly input into the ER calculations sheet.
Monitoring equipment	Wherever it is collected, the copy (paper and electronic) of the users is maintained at the office in Udaipur. The Project Officer and Desk Worker cross check the database entries and take corrective measures for any errors. They suggest and comment on appropriate corrective measures if needed. App-based data is available on the dashboard of database.
Measuring/reading/recording frequency:	Continuous basis. An ICS starts to generate emission reductions once it is disseminated to the household and the user signs the End User Agreement. The number of days a stove was in operation in the year is determined after deducting the days of non-usage.
Calculation method (if applicable):	Total days in the monitoring period (minus) Days not operational The use of traditional stoves and also LPG due to non-usage of ICS has been included in the traditional stove monitoring sheet. As there are 10 codes for various food items prepared, it is not a single matrix. Hence, the number of days of each family using traditional stove/LPG and the purpose of use is included in a separate excel sheet. From this data, the fuelwood use on traditional stoves and substitution on LPG is calculated and included in the final ER Calculations sheet. For ex. if tea is prepared and water is heated on traditional stove or LPG, $0.0007 + 0.0013$ t/day is subtracted from baseline fuelwood use multiplied by the number of days of use. Hence the calculation of operational days is in terms of fuelwood use substituted for the baseline directly (after deducting the non-operational days).
QA/QC procedures:	Though this is not stipulated by methodology, as a good practice and to reduce uncertainty in emission reduction calculations, 100% monitoring of all installed units are being done. This is also to create awareness and make a complete shift to cooking on ICS on an on-going basis in the project area.
Purpose of data:	Calculation of emission reductions
Additional comments:	The main objective of the project is to provide energy services to the rural communities. Hence monitoring is done to take up repair and maintenance of the units at the earliest. This enables the rural households to continue using ICS and not go back to traditional cook stoves.

Data/parameter:	Number of improved cook stoves that would get replaced during the crediting period
Unit	Number
Description	If the stove is damaged and cannot be repaired, the stove is replaced by another ICS.
Measured/calculated/default	Measured
Source of data	Monitoring database
Value(s) of monitored parameter	183 stoves were replaced in the project area.
Monitoring equipment	There is no monitoring equipment. Monitoring by the GS VER Team
Measuring/reading/recording frequency:	Continuous monitoring
Calculation method (if applicable):	<ul style="list-style-type: none"> - In case the replacement of ICS within the household is necessary, e.g. due to damage, the household receives a new ICS with a corresponding new identification number (Appliance ID). - The household signed a new end user agreement where the number was noted and updated on the monitoring database.

QA/QC procedures:	A copy of the old agreement is stapled with the new agreement, and the same is updated on the monitoring database. The last date of use of the old ICS is recorded.
Purpose of data:	To maintain a creditable database of the operational units
Additional comments:	

Data/parameter:	The traditional cook stove are disposed/not used in the households in which ICS is implemented					
Unit	Numbers					
Description	The low efficient traditional cook stoves are disposed off during the implementation of the project activity. In subsequent years, they are not used in the households in which ICS is implemented.					
Measured/calculated/default	Measured					
Source of data	Monitoring Data of Udaipur Urja Initiatives					
Value(s) of monitored parameter	<table><tr><td>Days of Non Usage of ICS during the Monitoring Period</td><td>512,427 (4.14%)</td></tr><tr><td>Days of parallel use of traditional stoves/LPG during the Monitoring Period</td><td>1,927,457 (15.57%)</td></tr></table> <p>The traditional stoves are predominantly used for cooking fish/meat, fodder for animals and heating water. The traditional stove-monitoring sheet provided shows the data. LPG was predominantly used for making quick tea and coffee.</p>		Days of Non Usage of ICS during the Monitoring Period	512,427 (4.14%)	Days of parallel use of traditional stoves/LPG during the Monitoring Period	1,927,457 (15.57%)
Days of Non Usage of ICS during the Monitoring Period	512,427 (4.14%)					
Days of parallel use of traditional stoves/LPG during the Monitoring Period	1,927,457 (15.57%)					
Monitoring equipment	There is no monitoring equipment. Monitoring is done by the Monitoring Team					
Measuring/reading/recording frequency:	<p>-The non- usage of ICS systems or the use of traditional stoves is recorded in the monitoring database.</p> <p>- The usage of the traditional cook stoves are recorded through the household visits conducted at village level for each of the beneficiary.</p>					
Calculation method (if applicable):	<p>- When the baseline stoves/LPG usage continues at the household level, monitoring ensures that the wood fuel consumption of those stoves is excluded from By in equation 3 of the methodology. The village level volunteers record this information during their visits to the household and record this information.</p> <p>- This is updated on the monitoring solution. The fuelwood use for preparing the food items on traditional stoves and LPG use are discounted during emission reduction calculations for the days of use.</p>					
QA/QC procedures:	The database entries are made by the village level volunteers and data is also cross verified by FCN.					
Purpose of data:	To made credible emission reduction calculations based on monitoring 100% of the ICS installed and to educate the households to stop using inefficient traditional cook stoves.					
Additional comments:	About 77% of the households have in parallel used traditional stoves/LPG for various periods during 2019, while it was 35% in 2017, which increased to 69% in 2018. This is primarily because the households were provided LPG at subsidized rates during the past 2 years in the project region. LPG use is on the rise especially for preparing tea and coffee quickly. Rest of the cooking is usually done on ICS. Occasionally, parallel uses of traditional stoves are for cooking fodder. The village volunteers and the caseworkers educate the households of the ill effects of using traditional cook stove and address any issues they have with cooking with ICS.					

D.3. Implementation of sampling plan

>> (If data and parameters monitored described in section D.2 above are determined by a sampling approach, provide a description on how project participants implemented the sampling plan and surveys for those data and parameters according to the approved PDD.)

The various parameters that need to be monitored are as follows:

- (i) Number of households in which ICS appliances will be used
- (ii) Start date of usage of appliances by the family
- (iii) Non-usage of ICS
- (iv) Number of improved cook stove than would get replaced during the crediting period
- (v) The traditional cook stoves are disposed/no used in the households in which ICS is implemented.
- (vi) Checking the efficiency of representative sample thereof at least once every two years that they are still operating at specified efficiency.

The above parameters from (i) to (v) is monitored for all the improved cook stoves that is implemented under the project activity through village monitors. Based on the registered PDD, the sampling plan for emission reduction calculations is only parameter (vi), i.e. checking the efficiency of representative samples at least once every two years is to be done for representative samples.

a) Sampling Design

(i) Objectives and Reliability Requirements: The objective of the sampling effort is to determine the mean value of parameter (vi) i.e. checking the efficiency (η_{new}) of representative samples at least once every two years that they are still operating at specified efficiency.

The reliability requirements for sample size is 95/5 confidence/precision during the crediting period.

(ii) Target Population: The target population is the rural households where improved cook stoves (Greenway Jumbo Stove and/or Greenway smart stove) will be implemented and are operational in Udaipur district of Rajasthan State, India. These rural households are from Tehsils of Girwa, Jhadol, Kherwara, Rishabhdev and Sarada.

(iii) Sampling Method: The sampling method chosen for the project area is stratified random sampling. The grouping of population for the strata are the stove model that is being used by the families. There are 2 stove models and 5 Tehsils in which the project is implemented. Hence a minimum of 3 stoves of both the models were selected for testing.

(iv) Sample Size: According to PDD, the sample size was determined using the equation

$$n \geq \frac{1.96^2 NV}{(N-1) \times 0.05^2 + 1.96^2 V}$$

Where:

$$V = \left(\frac{SD}{mean} \right)^2$$

n	Sample size
N	Total number of households (18,500)
Mean	Overall Mean
SD	Overall standard deviation
1.96	Represents the 95% confidence required
0.05	Represents the 5% relative precision

A pilot study of minimum 3 stoves from each model and Tehsil was conducted to determine the mean and standard deviation. The overall mean and standard deviation was estimated. The equations were weighted according to the total number of households and model type in each Tehsil.

The overall standard deviation was estimated as follows:

$$SD = \sqrt{\frac{(g_a \times SD_a^2) + (g_b \times SD_b^2) + (g_c \times SD_c^2) + (g_d \times SD_d^2)}{N}}$$

Where

SD Weighted overall standard deviation and SD_a to SD_d is the standard deviation of the groups

g_a to g_d Size of the group where g_a to g_d are the groups in the Tehsils with stove models.

N Population total

$$mean = \frac{(g_a \times m_a) + (g_b \times m_b) + (g_c \times m_c) + (g_d \times m_d)}{N}$$

Where:

$mean$ Weighted overall mean

m_a to m_d Mean of the groups within Tehsils and the stove models

Proportional allocation of number of households was done to each of the Tehsils and stove model type. Hence the size of the sample from each Tehsil and model type is proportional to the size of the households in each Tehsil and model types in the project area. The equation for each of the strata is:

$$n_1 = \frac{g_a}{N} \times n$$

The sample was drawn at random from the sampling frame. For each of the Tehsil, the mean and standard deviation of the efficiency determined was as follows:

Tehsil	Type of Stove	Number of Households	Mean stove efficiency	Standard Deviation in efficiency
Girwa	Greenway Smart Stove	2,715	0.295	0.016
Jhadol	Greenway Smart Stove	3,927	0.283	0.010
Kherwara	Greenway Smart Stove	8,193	0.299	0.010
Rishabhdeo	Greenway Smart Stove	3,269	0.283	0.008
Sarada	Greenway Smart Stove	396	0.285	0.004
Girwa	Greenway Jumbo Stove	2,715	0.275	0.007
Jhadol	Greenway Jumbo Stove	3,927	0.288	0.009
Kherwara	Greenway Jumbo Stove	8,193	0.292	0.005
Rishabhdeo	Greenway Jumbo Stove	3,269	0.274	0.003
Sarada	Greenway Jumbo Stove	396	0.286	0.004

Substituting the values from the above table to the equations gives:

	Greenway Smart Stoves	Greenway Jumbo Stoves
Overall SD	0.011	0.0063
Overall Mean	0.29191	0.2852
V	0.001	0.0005
n	3	1
Count	15	15
Standard Error of Mean	0.003	0.002

Confidence (95%)	0.0055	0.0032
Reliability	1.89%	1.12%

Assuming proportional allocation, which means that the number of households that will be sampled from each of the stratum is proportional to the size of the stratum within the population.

Tehsil	Number of Stoves	Greenway Smart Stove		Greenway Jumbo Stove	
		Sample size (n_i)	Actual Sample Size	Sample size (n_i)	Actual Sample Size
Girwa	2,715	1	3	1	3
Jhadol	3,927	1	3	1	3
Kherwara	8,193	2	3	1	3
Rishabhdeo	3,269	1	3	1	3
SARADA	396	1	3	1	3

(i) **Field Measurements:** The variable to be measured and recorded on field is efficiency of cook stoves (η_{new}). Statistically valid sample of the locations where the systems are deployed, with consideration strata as described above was used to determine the number of stoves to be tested for efficiency of stoves biennially. Since the parameter of interest is not subjected to seasonal fluctuations, the testing was done at an interval of every 2 years from implementation. Water Boiling Test was carried out biennially on statistically determined representative samples using the standard testing protocol developed by PCIA. After two years, two-year-old stoves were tested. The value obtained from the test was used to calculate the emission reductions of the systems for that year of operation. For in-between years, the efficiency test results obtained from the previous tests was applied. The stoves were obtained from frequent users who used it at least 2 times a day. The mean values of the tests were considered and were tested for 95/5 precision (95% confidence interval and 5% margin of error).

(ii) **Quality Assurance/Quality Control:** To confirm the efficiency of appliance(s), it will be measured by repeating the Water Boiling Test biennially. In cases where the result indicates that 95/5 precision is not achieved, the lower bound of a 95% confidence interval of the parameter value will be chosen as an alternative to repeating the survey efforts to achieve the 95/5 precision. Experts from FCN were involved in testing the cook stove efficiency. They were also involved in training the field staff to conduct the tests and validate the test results.

(iii) **Analysis:** The data obtained from the tests were entered into Microsoft Excel sheets, analyzed and compared with the original efficiency of the stoves. Where appliances are found to be operational but with a changed lesser efficiency, the actual efficiency determined in monitoring was applied to calculate emission reductions.

(c) Implementation:

(i) **Implementation Plan:** The implementation of sampling effort was done by the NGO in consultation with CDM consultant and experts to conduct stove efficiency tests. The collected data was analysed for emission reduction calculations and inclusion in the monitoring report.

As described in B.7.1 and elaborated in B.7.3., parameters (i) to (v) described above was monitoring continuously by village monitors for all the households. For parameter accounting for leakage, B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for leakages. Hence, surveys for determining leakage were not conducted. Thus, there is no specific sampling plan required for monitoring these parameters.

Sampling for monitoring SD Indicators

The sustainable development indicators were monitored and data extracted through following two processes:

- i. Sample Survey: These are parameters which are monitored biennially
- ii. Records of activities conducted: Records are maintained for programmes conducted such as trainings, workshops, etc.

Sample Survey

As discussed in registered passport, two parameters need to be monitored through sample survey. They are (a) Air Quality and (b) Livelihood of Poor

These parameters were monitored by FCN Technical Team of Fair Climate Services Pvt. Ltd. (CDM Consultant) in collaboration with UUI staff. Questionnaire was designed, field tested and implemented for the survey. Based on the field test, the questionnaire was modified and implemented. A stratified random sampling was conducted in the project area to monitor the sustainable development parameters.

The objective of the survey is to obtain unbiased and reliable data on above selected sustainable development parameters in order to assess the impact of project activity as discussed in the registered GS passport.

Sampling Frame: The sampling frame that was used was the households using Improved Cook stoves. These are in the database of the UUI.

Target Population: The target population is the rural households using Greenway cook stoves implemented under the project activity and the target parameters are Air Quality and Livelihood of Poor.

Sampling Method: Household level questionnaire method was employed to conduct the survey and collect information. The questionnaire adopted for the survey is included in Annex 1. The questionnaire was composed on various sections keeping in view the order, ease of questioning by surveyors and answering by respondents. The questionnaire was field tested, to obtain an approximate idea of how well the draft questionnaire provided appropriate results. The questionnaire was revised and administered.

The sampling method chosen for the project area is stratified random sampling, wherein each sub-district is a stratum. It is easy to implement as the villages in all the Tehsils where Greenway stoves has been implemented is known and stored in the monitoring database. Each of the sub-district Girwa, Jhadol, Kherwara, Rishabhdeo and Shrada was treated as a stratum. Thus, sampling was done for each of the sub-district to ensure that all the areas were well represented.

Table 4: Details of the sample survey conducted for the monitoring period

Sub-Districts	Number of Villages	Number of Households
Girwa	5	21
Jhadol	5	21
Kherwara	9	42
Rishabhdeo	5	20
Shrada	2	4
Grand Total	26	108

Determination of Sample Size: The sample size was determined based on the parameters that need to be determined to assess the sustainable development indicators as discussed in GS passport. The parameters of interest are qualitative data. Hence, 108 families were sampled in all the sub-districts.

Table 5: Sub-District wise details of villages and end-user households sampled

Sub-district	Village	Number of Households
Girwa	Amarpura	4
	Nangela	4
	Paduna 1	5
	Paduna 2	4
	Patiya (girwa) 1	4
Jhadol	Aamaliya	5
	Badlipada	4
	Bansivada	2
	Bhamti 1	5
	Nichli sigri	5
Kherwara	Barothi brahmanan	4
	Guda	4
	Jhanjri	5
	Jhunthri 1	5
	Kadiyanala	4
	Magra 1	5
	Nichla talab	5
	Samited 1	5
	Saredi	5
	Depur 1	4
Rishabhdeo	Gumanpura 1	4
	Karji	5
	Katev	3
	Maal	4
Sarada	Krishnapura 1	3
	Krishnapura 2	1
Grand total		108

The data collected was entered into excel sheet for data storage and analysis.

Field Measurement: The frequency of measurement is biennial during the monitoring period. Data was collected for the monitoring year 2017-18 and 2018-19 and the Sample Survey was conducted during August-September 2019. The details of the surveys are as follows:

Year of Survey – 2019

Monitoring Period – October 2017 to July 2019

Survey Dates: August and September 2019

Frequency of survey according to the registered PDD: biennial

Interviewers information and contact detail is Waheed Mohammed, FCS; waheed@fairclimate.com. The interviewees details are provided in the Excel survey sheets.

Quality Assurance/Quality Control: The QA/QC procedure was to achieve good quality data through field measurements. The household level questionnaire was designed and field-tested before administering the actual questionnaire survey. The survey was done by the FCN Technical Team. Oversampling was done to replace non-respondents, if any. The data collected was entered by and further crosschecked by the FCN Technical Team. The households were selected randomly without any bias.

Analysis: The data entry was done in Microsoft excel sheet. The data was crosschecked with the filled in questionnaire by FCN as QA/QC procedure. The data was analysed for responses to the parameters.

Implementation Plan: The implementation of sampling effort was done by the FCN Technical Team. The FCN has the skill and resources to implement the sampling procedure. The team is experienced with rural energy carbon projects implemented for the rural poor. The collected data was analysed by the FCN for inclusion in the monitoring report.

SECTION E. Calculation of SDG outcomes

E.1. Calculation of baseline value or estimation of baseline situation of each SDG outcome

>> (Provide details of equations and approaches used to calculate/estimate baseline values.)

The methodology calculates emission reductions directly. Hence the ex-post calculations of emission reductions is

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel}$$

Where:

ER_y	Emission reductions during the year y in tCO ₂ e
$B_{y,savings}$	Quantity of woody biomass that is saved in tonnes (2.19 t/family)
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass (0.88)
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. (81.6 tCO ₂ /TJ)

Calculations of biomass savings ($B_{y,savings}$)

$$B_{y,savings} = \sum_{i=1}^n B_{old} \cdot L_y \cdot N_{y,i} \cdot \left(1 - \frac{\eta_{old}}{\eta_{new}}\right)$$

Where:

B_{old}	Quantity of woody biomass used in the absence of the project activity in tonnes [3.21 t/family(two 1 pot)/yr fixed throughout the crediting period]
η_{old}	Efficiency of the baseline system/s being replaced (0.10 fixed for the entire crediting period)
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction) as determined using the Water Boiling Test protocol.
L_y	Leakage Factor determined for the year y. This is fixed for the entire crediting period (0.95).
$N_{y,i}$	Appliance operating per year and vintage

Number of appliances operating per year ($N_{y,j}$)

$$N_{y,i} = \sum_{j=1}^{N_{y,i}} n_{y,j} \cdot t_{y,j}$$

Where:

$n_{y,j}$ = Appliance operating per year and vintage

$t_{y,j}$ = Fraction of operating time per household (appliance(s)) per vintage

The ER calculations for each household is provided in the ER Calculations Microsoft Excel Sheet, after considering leakage.

Based on the methodology, B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys is not required.

The ER calculations for each household is provided in the ER Calculations Microsoft Excel Sheet, after considering leakage.

E.2. Calculation of project value or estimation of project situation of each SDG outcome

>> (Provide details of equations and approaches used to calculate/estimate project values.)

There are no project emission calculations.

E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome

>> The direct calculations for emission reductions for each of the households is shown in the Microsoft Excel Sheet. The total emission reductions

Vintage Year	Baseline GHG emissions or baseline net GHG removals	Project GHG emissions or actual net GHG removals	Leakage GHG emissions	GHG emission reductions or net anthropogenic GHG removals
	(t CO ₂ e)	(t CO ₂ e)	(t CO ₂ e)	(t CO ₂ e)
2017 (Oct-Dec 2017)	10,608	0	530	10,078
2018 (Jan-Dec 2018)	40,965	0	2,048	38,917
2019 (Jan-July 2019)	21,411	0	1,070	20,341
Total	72,984	0	3,648	69,336

Sustainable development Indicators Monitored

The SD parameters were monitored through a sample survey. The details of the survey are given in section D.3. The SD parameters monitored are as follows:

No	01
Indicator	Air Quality
Mitigation measure	N/A
Chosen parameter	- No. of Stoves working - Decrease in smoke in kitchen compared to baseline based on community perspective through biennial survey
Current situation of parameter	The current practice in the baseline is use of traditional 3 stone/mud stove which results in severe indoor air pollution with high firewood consumption.
Estimation of baseline situation of parameter	As per available literature as mentioned in PDD, on an average 3.23 tonnes of firewood is consumed by a household size of 4.34 people on an inefficient cook stove per year. This is leading to indoor air pollution causing respiratory problems & other skin diseases mainly for women and children.

Future target for parameter		The improved cook stove "GREENWAY" will help reduce indoor air pollution & reduce firewood consumption through thermal efficiency. This will improve indoor air quality, health of women & children and will save cooking time.
Way of monitoring	How	Monitor the ICS usage through sample survey and record the difference experienced by families compared to baselines.
	When	Biennially
	By who	Village Representatives, Udaipur Urja Initiatives Staff and CDM Consultant

No		02
Indicator		Quality of employment
Mitigation measure		N/A
Chosen parameter		Number and type of training sessions, workshops and seminars Creating job opportunities in the region of the project.
Current situation of parameter		There is no dedicated programme on improved cook stoves in the project area
Estimation of baseline situation of parameter		There are not jobs associated with implementation of improved cook stove programme
Future target for parameter		At the village and Tehsil level dedicated employment gain to monitor the project activity such as training programme for the village level volunteers for monitoring, repair and maintenance of stoves and training to communities for proper use of stove and its maintenance by Udaipur Urja Initiatives. Creation of temporary jobs for poorly qualified men and women due to project activity.
Way of monitoring	How	Number of training sessions, workshops and seminars in the project area for the personnel monitored through documentation/minutes of the meeting.
	When	Annually
	By who	Udaipur Urja Initiatives Staff

No		03
Indicator		Livelihood of the Poor
Mitigation measure		N/A
Chosen parameter		1.Lesser time spent on collection of fuelwood; more time to do other activities 2. Money spent to collect fuel
Current situation of parameter		As per the NSSO survey, 2007, present distribution of households by primary source of energy nearly 94% of the households in Rajasthan use firewood as the primary source of energy in the Kitchen.
Estimation of baseline situation of parameter		The proposed project is implemented in the biomass deficient district of Udaipur in the state of Rajasthan. The communities spend considerable time in collecting fuelwood.
Future target for parameter		Lesser need for fuelwood will reduce the time taken to collect fuelwood. Reduction in money spent to purchase fuel
Way of monitoring	How	1.The indicator will be monitored through a sample survey to review time spent for collecting firewood and reduction in money spent to collect fuelwood compared to baselines 2.Village level volunteers for monitoring and repair and maintenance of stoves.

	When	Biennially
	By who	Udaipur Urja Initiatives Staff

No	04	
Indicator	Access to affordable and clean energy services	
Mitigation measure	N/A	
Chosen parameter	Availability of GREENWAY at marginal cost to identified families and its usage for the next 10 years with service and maintenance, which will be charged from the village fund collected from cost contribution by households. No. of stoves being used; ease of cooking.	
Current situation of parameter	In the baseline scenario, women are cooking on traditional cook stove.	
Estimation of baseline situation of parameter	The rural poor are not able to afford improved cook stove, thus denied of clean energy services.	
Future target for parameter	Use of improved cook stove GREENWAY, which will be disseminated under the project activity.	
Way of monitoring	How	Number of households using improved cook stoves. This data will be entered into the monitoring database for all the beneficiary families.
	When	Annually
	By who	Village Representatives will collect information on usage of GREENWAY, which will be entered into the monitoring database for the project activity.

No	05	
Indicator	Human and Institutional capacity.	
Mitigation measure	N/A	
Chosen parameter	Empowerment of local communities, Training to the local communities, Community development through CER revenue.	
Current situation of parameter	The project beneficiaries are mostly daily labourers and farmers living below the poverty line. These households are from the lower economic strata and nearly 99% of this economic strata households use firewood for cooking.	
Estimation of baseline situation of parameter	There are no dedicated village level institutions in these villages to promote human and institutional capacity for improved cook stoves program.	
Future target for parameter	Empowerment of local communities with regard to the project activity through training programmes and institution building.	
Way of monitoring	How	Capacity building programmes conducted by Udaipur Urja Initiatives for which reports will be prepared
	When	Annually
	By who	Udaipur Urja Initiatives Staff

No	06	
Indicator	Quantitative employment and income generation	
Mitigation measure	N/A	
Chosen parameter	Monetary benefits to the households & Jobs created due to the project activity.	
Current situation of parameter	Cooking is by traditional cook stoves, which does not involve employment and income generation.	
Estimation of baseline situation of parameter	No jobs or monetary benefits to the households related to Improved cook stove project activity in the project area.	

Future target for parameter		The project will create organised employment to take care of the project operations and maintenance and monitoring till the project life. CER revenue will also be shared with the project beneficiaries based on the end user agreement between Udaipur Urja Initiatives and 18,500 beneficiary families.
Way of monitoring	How	Number of jobs that will be created due to the project activity with better than local average or above minimal wage. CER revenue to the community.
	When	Annually
	By who	Udaipur Urja Initiatives Staff

No		07
Indicator		Balance of Payments and Investment.
Mitigation measure		N/A
Chosen parameter		Investment to local energy needs and access to foreign direct investment
Current situation of parameter		Community owned projects get no financial access to take up such projects.
Estimation of baseline situation of parameter		Lack of foreign direct investment and more dependency on farm income.
Future target for parameter		The project implementation will be done by forward sale of emission reductions by attracting foreign direct investment in the project region. The project exposure will help communities to manage understand their responsibility on international climate market and issues. The carbon market activity will help them connect to international economic markets.
Way of monitoring	How	Statements of investment for the project activity
	When	Annually
	By who	Udaipur Urja Initiatives staff

No		08
Indicator		Technology transfer and technological self-reliance
Mitigation measure		N/A
Chosen parameter		<ul style="list-style-type: none"> - Number of woodstoves being used - Number of workshops, trainings, seminars organized for participants outside the project boundary. - Number of participants attending the capacity building programmes
Current situation of parameter		Currently, traditional 3 stone mud chullas are used with firewood, twigs and other forms of biomass to cook every day. Traditional stoves are financially more viable and are less technologically advanced leading to higher emissions and more firewood consumption. These stoves are inefficient as they are without chimney and grate and has minimal thermal efficiency. There is no other alternative source of technology.
Estimation of baseline situation of parameter		As per the demographic survey done by Udaipur Urja Initiatives, 99% of the families are dependent on firewood and other agro residues for their cooking energy needs and the only technology known and affordable is use of mud stove's or 3 stone stove.
Future target for parameter		The project will be implemented with the right synergy of NGO and village level institutions with capacity building in the form of workshops, trainings and seminars to help adapt the technology and build self-sufficiency within communities to carry the project.

		Ensure that dissemination of ICS will eliminate use traditional cook stoves. This will save fuel wood consumption while empowering knowledge among the communities on the ICS technology through various workshops and awareness programmes.
Way of monitoring	How	Records maintained by Udaipur Urja Initiatives with regard to workshops, trainings and seminars conducted/attended/presented for participants outside the project boundary.
	When	Annually
	By who	Udaipur Urja Initiatives Staff

E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)
2017 (Oct-Dec 2017)	10,608	0	530	10,078
2018 (Jan-Dec 2018)	40,965	0	2,048	38,917
2019 (Jan-July 2019)	21,411	0	1,070	20,341
Total	72,984	0	3,648	69,336

The following section based on 2.2 version of the GS presents the sustainable development indicators and outcomes of the project activity based on the registered passport.

No	01	
Indicator	Air Quality	
Chosen parameter	- No. of Stoves working - Decrease in smoke in kitchen compared to baseline based on community perspective through biennial survey	
Outcome: i) In the baseline of the project area, the beneficiaries were using traditional cook stoves in order to cook and heat water. Fuel wood is the main energy source to meet their energy needs. Excessive smoke by burning fuel wood using traditional stoves was the main cause of eye related and respiratory problems. These problems have decreased drastically after implementation of the project activity. Every household was trained for proper use of cook stove, which includes the way to light the stove and feed fuel wood. This ensures reduced smoke and particulate matter in the kitchen. About 223 families have migrated in and out of the project area during various periods and have not been included for ER Calculations for the specific period of their absence in the project boundary. However, these families have taken the stoves along with them for their usage. Continuous repair and maintenance of the stoves have ensured that all the stoves are being used by the project households. A repair workshop is established and the mechanic has undergone training by the manufacturer for repair of the stoves. This has ensured high usage rates in the project region. The repairs carried out during the monitoring period is as follows: The major repairs that were undertaken were repair of internal chamber due to rusting, repair of upper and lower lid of the stove. Until December 2018, replacements were done by the manufacturer for damaged stoves. Since December 2018, after establishment of repair centre, all the repairs of damaged parts are being done by UUI. The details of repairs and replacement of stoves done during the monitoring period is as follows:		
<table border="1"><tr><td>Details of Stove Replacement</td></tr></table>		Details of Stove Replacement
Details of Stove Replacement		

Block	Jumbo Stove	Smart Stove	Total Replacement
Girwa	34		34
Jhadol	6	1	7
Kherwara	178	15	193
Rishabhdeo	76	4	80
Grand Total	294	20	314
Details of Repairs			
Girwa	11		11
Jhadol	32	1	33
Kherwara	274	15	289
Rishabhdeo	129	4	133
Grand Total	446	20	466



Fig 3: Repair Centre in Udaipur District for the project activity

ii) From the survey, it is observed that the overall air quality inside the kitchen has improved significantly. All the surveyed beneficiaries (100%) responded that the use of Greenway Smart and Jumbo Stoves has led to reduction in indoor smoke level and reduction in eye and respiratory related health issues. With the earlier mud stoves, women had to keep blowing so frequently that there was more smoke and they would suffer from headaches and burning of eyes. Due to portability of the stoves, they can cook outdoors too, reducing indoor air pollution and health issues to the woman of the family.

Air Quality	Response of interviewed beneficiaries
	After the project
Indoor smoke (%)	Reduced (100%)
Eye related Problems (%)	Reduced (100%)
Respiratory related Problems (%)	Reduced (100%)

Table 6: Reduction in smoke, eye and respiratory related problems due to smoke





Figure 4: Cooking on Greenway Jumbo and Smart Stove resulting in less indoor smoke



Figure 5: Portability of stoves providing convenience to the women.

From the above figures it is evident that the smoke inside the kitchen is reduced significantly compared to traditional stoves. All the beneficiaries experience positive impact of Greenway stoves in improving the health of especially the women in the family. The women engaged in kitchen seem to be the main beneficiaries of the ICS who have to sit in front of the stove while cooking. The survey revealed that all respondents were rid of eye related problems and there is reduction in respiratory related problems.

Health Problems	Percent of respondents
Reduction in smoke	100
Eye Irritation reduced	100
Respiratory Problems Reduced	100

Table 7: Impact of Greenway Improved Cook stoves on health of the woman

No	02
Indicator	Quality of employment
Chosen parameter	i) Number and type of training sessions, workshops and seminars ii) Creating job opportunities in the region of the project.
Outcome: i) During implementation, awareness was created through various social gatherings and media such as posters and banners, village wall paintings, puppet shows, distribution of pamphlets and leaflets, door-to-door campaign, focused group discussions and village level demonstrations. These were elaborated in the first monitoring report.	
The trainings during this monitoring period held with UUI Staff and women monitors was with the purpose to build capacities, increase outreach of UUI and motivate them to perform even better. The prime focus has been to improve the efficiency of the monitoring and repair mechanism of improved cook stoves. The village level volunteers were also taken to Greenway Factory in Vadodara to undergo training for repair and servicing of cook stoves.	

Sl. No.	Training name	Location	Date	Participants
1	Monitor Training - Annual Camp	Udaipur	24-10-17 till 26-10-17	102
2	Monitor Training - Technical training to monitors for servicing and repair of cook stoves	Greenway Gramin Factory -Vadodara	27-04-18 till 29-04-18	13
2	Monitor Training	Udaipur	07-06-18	5
3	Monitor Training - Annual Camp	Udaipur	8-05-19 till 10-05-19	98
4	Monitor Training	Jhadol block	15-05-19	5
5	Monitor Training	Madri - Jhadol block	27-05-19	12
6	Monitor Training	Kherwara Office	13-06-19	13
7	Monitor Training	Kherwara Office	19-07-19	16

Other than the above listed meetings, monthly meetings with the monitors are being held at block level. In addition to this, village monitors and field executives also attend zone – level meetings, conducted by UUI/Seva Mandir every month.

S.No.	Block	Location	Date	Number of Participants
1	Kherwara	Sagwara & Suveri	28th of every month	17
2	Kherwara	Patiya & Karawada	26th of every month	23
3	Kherwara	Bawalwara	27th of every month	21
4	Kherwara	Kalyanpur	25th of every month	13
5	Girwa	Kaya	25th of every month	23
6	Jhadol	Jhadol	27th of every month	29
7	Zone meetings	Zones of each Block	From 1st to 5th of every month	

Agenda for the meetings include the following:

1. Submission of monitoring book by the monitors for checking by the field executives and verification of monthly payment.
2. Discussion of issues related to repairs and replacements of handles and nets for cook stoves brought forward by the monitors.
3. Distribution of handles and nets as per demand by each monitor if any replacement needs to be done.
4. Other monitoring parameters like percentage of ICS usage and old stove usage is shared by every monitor.
5. Sharing experiences of stove users.
6. Any other agenda as per requirement of the project
7. Mobile Phone App Training: A new phase in ICS monitoring was initiated January 2017. Training was imparted to select village level monitors for mobile phone app monitoring. Emphasis was laid on digital integration for monitoring purpose, thereby making data collection paperless. At present, 110 monitors (out of 126) are using smart phones for monitoring daily use of cook stoves.

S.No.	Training	Location	Date	Number of Mobile Monitors added
1	Mobile Training	Udaipur	15-Jan-17	6
2	Mobile Training	Udaipur	17 & 18-Jul-18	52
3	Mobile Training	Udaipur	10 & 11-May-19	68



Fig 6: Training to Village level Monitors for app-based monitoring



Fig 7: Training village level monitors for repair of stoves at Grameen Greenway Factory, Vadodara

Staff training programs were conducted regularly. The first staff training was for capacity building to improve communication between staff members. Second training dealt more on the idea of self – planning and motivation. Both the trainings were conducted by external as well as internal facilitators. Third training aimed at relating mission and vision of the company with the objectives, followed by budget preparation.

Sl. No.	Training name (Distribution, Monitoring, Refresher)	Location	Date	Participants
1	Staff Training	Udaipur	16 & 17-Feb-18	16
2	Staff Training	Udaipur	19-Jul-18	18
3	Staff Training	VBRI, Udaipur	26 & 27-Apr-19	18

ii) The project has created several jobs for the rural communities. The jobs created for the project activity is as follows:

Jobs created	Number	Men	Women
Permanent Staff	17	12	5
Consultants - Full time	3	3	0
Consultants – Part Time	1	0	1
Repair and Service Technician	1	1	0
Volunteer	1	0	1
Data Entry Operators	1	0	1
Monitors/ Distributors	126	0	126
Total	150	16	134

150 jobs are created due to the project activity of which 134 are for women and 16 are for men. All the village monitors are women from the villages. In addition, the project provided temporary jobs during marketing phase, when they were hired for door-to-door marketing, distribution of stoves and follow-up.

No	03
Indicator	Livelihood of the Poor
Chosen parameter	1. Lesser time spent on collection of fuelwood; more time to do other activities 2. Money spent to collect fuel
<p>Outcome: According to the study conducted by Duke University⁵ in the project region for about 600 households, it was observed that households exposed to the intervention spent less time cooking and collecting solid fuels @ 0.5-0.7 hrs/day. According to the study, it also suggests that adopting households had reduced firewood use, relative to non-adopters, by over 2 kg/day. One might wonder what households did with the additional 0.5-0.7 hrs/day that were saved. To consider this question, the study used data from the time diaries provided by the primary cook in each household. Only 492 (out of 590) primary cooks completed such diaries, but analysis of this evidence suggest that the time gains were allocated primarily to additional rest, which increased by 0.4-0.6 hrs/day. Time spent on other activities – food preparation (1.2 hrs/day) and other domestic tasks (3.5 hrs/day), farm (5.9 hrs/day) or other labor (0.3 hrs/day), leisure (0.3 hrs/day), and other activities (0.05 hrs/day) – did not change substantively. The analysis of the effects of a biomass burning ICS promotion effort in the Udaipur, Rajasthan however points to a number of gains for households living in intervention villages. Respondents from households in these target areas save time, on both cooking and fuel collection, and reduce dung fuel consumption, which is commonly used for cooking in this location. Households also report a heightened perception of the positive impact that these technologies have on household welfare, relative to comparison households from non-intervention villages.</p> <p>The sample survey conducted for the monitoring period also suggested reduction in time spent for collecting fuelwood and cooking times. There was almost a 43% reduction in time-spent time for collecting fuelwood and cooking over their baseline scenario. A headload lasting for 2.5 days in the baseline for cooking now is used for 5 days. There was a reduction of 1.86 man days/week/household due to the project activity. Nearly 50% of women worked on their own land, grazed cattle or did other jobs, while a quarter of them had more time to rest and take care of their children with the time saved.</p> <p>Only 4% of the surveyed houses purchased fuelwood. They have reported a reduction in use of fuelwood, thereby saving money.</p>	

No	04
Indicator	Access to affordable and clean energy services
Chosen parameter	Availability of GREENWAY at marginal cost to identified families and its usage for the next 10 years with service and maintenance, which will be charged from the village fund collected from Greenway cost contribution by households. No. of stoves being used; ease of cooking.
<p>Outcome: The vast majority households (93%) in the sample are from scheduled castes or tribes or other backward castes. Poverty among sample households is high. Stoves are installed in 18,500 households in the project area with carbon money. The project has been implemented with carbon forward funding from Evangelisches Werk für Diakonie und Entwicklung e.V., Germany and Infosys. This has been possible only after registration of the project activity as a GS VER project activity. In the baseline, there were no dedicated budgets for distribution of Greenway improved cook stove in the project boundary. The stoves were distributed to the households at a subsidized rate. The stoves were given at Rs.500/-, which costs Rs.2900/- (UUI bought at this price) for 2 stoves of Jumbo and Smart Stoves. The carbon money has been able to subsidize the price of the stoves to the communities. In addition, continuous monitoring by the village monitors enable providing repair and maintenance of the stoves for the life of the stoves. Continuous awareness creation among the communities also ensures sustained interest of the communities to use ICS and not revert to traditional stoves. During the monitoring period, 183 stoves were replaced and 448 stoves were repaired for internal chamber, upper and lower lid of the stove. Another 598 stoves were replaced of their handles and meshes. Thus, during the monitoring period, about 7% stoves required repairs, which were attended to by UUI, the Producer Company. This was possible for exclusively for the project activity because of</p>	

⁵ Adoption and short-term impacts of improved biomass cookstoves in Udaipur, Rajasthan, July 2017.

training provided to the mechanic by the manufacturer, which was facilitated by UUI. The stoves do not have any moving parts and hence the repairs and replacements are at a minimum.

No	05
Indicator	Human and Institutional capacity.
Chosen parameter	Empowerment of local communities, Training to the local communities, Community development through CER revenue.

Outcome: The local communities are provided with demonstrations to use the ICS at the beginning of the project in each of the village. In addition community meetings are conducted regularly as shown below:

Sl. No.	Training name (Distribution, Monitoring, Refresher)	Location	Date	Participants
1	Community Meeting	Alsigarh, Gojiya Zone - Girwa	Dec-17	34
2	Community Meeting	Kalyanpur - Kherwara	Mar-18	47
3	Community Meeting	Bawalwara - Kherwara	Mar-18	50
4	Community Meeting	Patiya zone - Kherwara	Apr-18	54
5	Community Meeting	Suveri & Sagwara Zone - Kherwara	May-18	52
6	Annual General Meeting	Udaipur	May-18	240
7	Community Meeting	Girwa	May-18	29
8	Community Meeting	Kherwara	Jun-18	37
9	Community Meeting	Girwa	Jun-18	55
10	Community Meeting	Bicchiwada, Oda, Phalasiya - Jhadol	Jun-18	45
11	Community Meeting	Bawalwara - Kherwara	Jun-18	46
12	Block Annual General Meeting	Kherwara Block	Nov-18	76
13	Community Meeting	Jhadol	Dec-18	17
14	Community Meeting	Patiya zone - Kherwara	Jan-19	46
15	Community Meeting	Kalyanpur - Kherwara	Jan-19	63
16	Community Meeting	Saru - Girwa	Jan-19	15
17	Community Meeting	Awafala Saru - Girwa	Feb-19	5
18	Community Meeting	Parsad zone - Girwa	Feb-19	17
19	Community Meeting	Bawalwara - Kherwara	Feb-19	35
20	Community Meeting	Dolpura - verification visit	Mar-19	52
21	Community Meeting	Kojawada - Kirsten visit	Apr-19	42
22	Community Meeting	Bijali - Jhadol block - Kirsten visit	Apr-19	15
23	Annual General Meeting	Udaipur	May-19	220
24	Community Meeting	Sagwara - Kherwara - Kojawada, Pareda, Paredachak, Suveri	Jun-19	27
25	Product Demonstration Meeting	Shyampura-SHG Women-Kherwara	Jun-19	18
26	Product Demonstration Meeting	Ranawada-SHG Women-Kherwara	Jun-19	12
27	Product Demonstration Meeting	Garaja-Community Meeting-Kherwara	Jun-19	17
28	Product Demonstration Meeting	Bhagorpada-SHG Women-Kherwara	Jun-19	29
29	Community Meeting	Patiya zone - Girwa	Jul-19	37
30	Product Demonstration Meeting	Saredi-Women Meeting-Kherwara	Jul-19	15
31	Product Demonstration Meeting	Nichala Talab-SHG Meeting-Kherwara	Jul-19	35
32	Product Demonstration Meeting	Bawalwada-Ajivika Meeting-Kherwara	Jul-19	250
33	Product Demonstration Meeting	Bhalun-SHG Meeting-Kherwara	Jul-19	16
34	Product Demonstration Meeting	Pahada-Community Meeting-Kherwara	Jul-19	25
35	Block Annual General Meeting	Girwa	May-18	40

Training with local communities are broadly divided into 4 categories:

- Annual General Meeting (AGM) – it is being held once a year with all the directors and representative shareholders of the company. The main agenda of the meeting is to share the progress of the company, provide a platform to the stakeholders and discuss future strategies.
- Block Annual Gathering Meeting – After the AGM, block level gathering of shareholders is held with GVKs, Federations and the community members. These meetings are held with the aim of strengthening stakeholder partnership. Partnership here involves -Financial Partner (as in if UUI takes loan from them for certain businesses, shareholders), Operational Partners (as in the case of Agri-based procurement centre), Knowledge Partners (telling us what are the kinds of needs and services in the village right now), Adoption Partners (helping us to create adoption mechanisms for businesses in villages).
- Zone level Community Meeting- The zone level meeting is the platform where the discussions are about progress of current activities like cook stove project, solar light and agriculture procurement. These meetings are attended by GVCs, Zone Federation, Company shareholders and ICS monitors. Community feedback and suggestions is taken for current and upcoming activities of the company.
- Product Demonstration Meeting – These meetings are held in a village or cluster wherein various products like cook stoves, solar lights, water filters are demonstrated and their importance is explained to the people. These meetings are generally attended by communities, field executives, team leaders, monitors and members of GVC, Federations.

Major points discussed in these meetings are:

- ICS usage in respective zone, problems encountered if any while using cook stove, breakdown/need of repair etc.
- Solar light products and its services, and scoping to understand community specific needs regarding solar products.
- Agriculture procurement and mapping of procurement in respective zone.
- Demonstrate the new products like water filter, solar light, etc.
- Discussion on new business avenues like Water filter, solar pump, agriculture input tools etc.
- Mapping of community need with respect to technology and rural market.

Community Meetings		
Block	Number of meetings	Number of Attendees
Girwa	8	324
Jhadol	8	368
Kherwara	13	833
Total	29	1525



Figure 8: Block level Monthly and Yearly meetings of all the village level monitors

Campaigns undertaken during the monitoring period

Traditional Stove Demolition Campaign - Many dedicated campaigns were undertaken to emphasize the need to

switch to cleaner technology. In these campaigns, cook stove champions who have completely moved to using Improved Cook stoves were motivated to demolish their traditional stoves set-up as an act of moving forward towards better and cleaner technologies. These were undertaken collectively by the staff, village monitors, and members of the GVC and active users of ICS.



Fig 9: Traditional Stove breaking Campaign

World Environment Day Campaign - Environment Day, 5th June, was celebrated in the project region to create awareness about environment, which included climate change and the GS VER cook stove project. In 2018, three celebratory meetings were held in Kochla (Jhadol Block), Balicha (Kherwara Block) and Mor Dungari (Girwa Block) to mark the event. The highlights discussed in the meeting were as follows:

- Thanking the community for adopting clean technology mechanism to save the local as well as the global environment.
- Sharing of success stories of best users in the village with regard to adopting cook stoves.
- March in the Village to identify households still using traditional stoves and motivate them to break their traditional stoves and use improved cook stoves for all cooking.
- Discussion with children about saving the environment and the role they can play.

In 2019, for environment day, photography competition was organized for village monitors. They were asked to submit environment related photos along with their views on them. Best photos were selected at block level and given prizes. The prize distribution ceremony was also held at the blocks.

Community development through CER revenue: The money from the Cook Stove Programme that has gone into the individual GVK funds of the villages can be utilized for any activity, as decided by GVC in the village. In so far, Rs. 909,450 is the overall contribution into the GVC. It is added up to the funds of the village and used for different developmental activities. Development activities that have been carried out by the GVK have generally been as follows:

- i) Provide need based loans to women
- ii) Development of pasture land

iii)	Clean drinking water
iv)	Agricultural needs
v)	Salaries to para workers in the village who run Balwadi, Non-formal Education Centres, health workers and caretakers of community pasture lands
vi)	Provide loans to procure agricultural produce of the farmers at a fair price, etc.

No	o6
Indicator	Quantitative employment and income generation
Chosen parameter	Monetary benefits to the households & Jobs created due to the project activity.

Outcome: The stoves were distributed to the households at a subsidized rate. The stoves were given at Rs.500/-, which costs Rs.2900/- for 2 stoves of Jumbo and Smart Stoves. The carbon money has been able to subsidize the price of the stoves to the communities. In addition, several activities were undertaken with the GVC for the stove users, which include providing loans to women, development of pasturelands, providing clean drinking water and salaries to para workers in the villages who run village level schools, non-formal education centres, health workers and caretakers of community pasture lands and providing loans for agricultural produce at fair price.

The project has created several jobs for the rural communities. The jobs created for the project activity is as follows:

Jobs created	Number	Men	Women
Permanent Staff	17	12	5
Consultants - Full time	3	3	0
Consultants – Part Time	1	0	1
Repair and Service Technician	1	1	0
Volunteer	1	0	1
Data Entry Operators	1	0	1
Monitors/ Distributors	126	0	126
Total	150	16	134

150 jobs have been created of which 134 are for women and 16 are for men. All the village monitors are women from the villages. In addition, the project provided temporary jobs during marketing phase, when they were hired for door-to-door marketing and distribution of stoves.

No	o7
Indicator	Balance of Payments and Investment.
Chosen parameter	Investment to local energy needs and access to foreign direct investment

Outcome: The project has been implemented with carbon forward funding from Evangelisches Werk für Diakonie und Entwicklung e.V. Germany and Infosys. This has been possible only after registration of the project activity as a GS VER project activity. In the baseline, there were no dedicated budgets for distribution of Greenway improved cook stove in the project boundary. The stoves were distributed to the households at a subsidized rate. The stoves were given at Rs.500/-, which costs Rs.2900/- for 2 stoves of Jumbo and Smart Stoves. The carbon money has been able to subsidize the price of the stoves to the communities. In addition, continuous monitoring by the village monitors enable providing repair and maintenance of the stoves for the life of the stoves. Continuous awareness creation among the communities also ensures sustained interest of the communities to use ICS and not revert to traditional stoves.

No	o8
Indicator	Technology transfer and technological self-reliance
Chosen parameter	<ul style="list-style-type: none"> - Number of woodstoves being used - Number of workshops, trainings, seminars organized for participants outside the project boundary. - Number of participants attending the capacity building programmes

Outcome: The project has also contributed to technology transfer and technological self-reliance. The project is been implemented with the right synergy of Producer Company and the Village Development Fund with capacity building in the form of workshops, trainings and seminars to help adapt the technology and build self-sufficiency within communities to carry the project on standalone basis and to ensure that dissemination of ICS will eliminate use of

traditional cook stoves. This will save fuel wood consumption while empowering knowledge among the communities on the ICS technology through various workshops and awareness programmes.

UUI shared experiences with other organisations during this monitoring period for external audiences, the details of which are as follows:

S.No	Name of Organization/ Conference / Visits	Agenda / Location	Number of attendees	Date
1	Shashwat CleanTech	Exposure visit - Vadodara	8	Jan-18
2	Udaipur Chamber of Commerce and Industry (UCCI)	Award ceremony and Consultation	4	Jan-18
3	Australian National University & IIM, Udaipur	Field visit - Girwa, Jhadol	3	Feb-18
4	Infosys	Field visit - Jhadol, Badgaon	14	Mar-18
5	Greenway Grameen Factory	Exposure visit & Training - Vadodara	13	Apr-18
6	University of Alberta & Australian National University	Field visit & Consultation	3	May-18
7	University of Iowa	In-person - Interview on landscape of cookstove usage in rural Rajasthan with Dr. Meena Khandelwal	1	Jul-18
8	Ajeevika Bureau - Basic Health Services	Via email - Consultation on clean cooking for child daycare centres	1	Aug-18
9	AXIS Bank Foundation	Field visit - Jhadol	1	Oct-18
10	IRMA, Anand	Conference on Social Enterprises	1	Oct-18
11	Ms. Susan Lee from China, Shenzhen Power Solutions	Field visit - Nichla Talab, Kherwara	1	Nov-18
12	Mr. Nagaraj from JSMBT	Training on efficiency test of cookstoves	6	Dec-18
13	Plan India	Via email		Jan-19
14	Miami University & Australian National University	Field visit & Interaction	3	Jan-19
15	Carbon Check	Field visit - Girwa, Kherwara	1	Mar-19
16	BFWD	Field visit - Kherwara	1	Apr-19
17	Mr. Rahul Nainwal and Ms. Shubha to interact with monitors and develop training module from ISEED under IRMA, Anand.	Field visit - Alsigarh	2	Jun-19
18	Rajasthan Rural Energy Startup Summit - CIEE, IIM Ahmedabad & Start-up Oasis	Conference	2	Jun-19

19	DASRA, Mumbai	Leadership Program for Social Entrepreneurs	1	Oct-18, Dec-18, Feb-19

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD (tCO ₂)	Actual values achieved during this monitoring period (tCO ₂)
ER Calculations	75,954	69,336

E.6. Remarks on difference from estimated value in approved PDD

>>

There is no increase in the emission reduction during the monitoring period. The actual GHG emission reductions achieved is lesser than the amount based on the ex-ante estimation in the registered PDD.

SECTION F. Stakeholder inputs and legal disputes**F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions**

>> All the inputs with regard to project are regarding repair and maintenance, which was attended during the monitoring period.

F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

>> There were no inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period

There are no legal contests or dispute that has arisen with the project during the monitoring period.

Annex 1: Questionnaire for the sample survey

Improved Woodstoves in Udaipur - Helping Women and Environment

FCS

UUI

MONITORING SUSTAINABLE DEVELOPMENT INDICATORS

Team Members:				Date of Survey	
Beneficiary Details					
Name					
District	Udaipur	Sub-District			
Village		CDM ID No.			
Greenway Smart ID		Greenway Jumbo ID			
Date of ICS Installation					
Kitchen Observation					
Are you the primary cook (or primary user of stoves) in the household?					
What stove types and fuel types do you use for cooking?	ICS <input type="checkbox"/> LPG <input type="checkbox"/> Traditional Stove <input type="checkbox"/> Kerosene <input type="checkbox"/> Biogas <input type="checkbox"/> Electric stove <input type="checkbox"/>				
How often do you use the project stove?	_____Times/ (Day/ Week/ Month/ Year)				
When was the last time you used the project stove?					
How many times did you use the project stove in the past week?					
Physical signs of usage (Ash/black/char markings on stove, etc.)					
Hours of Use and Impacts					
Scenario	Morning (Hrs)	Afternoon (Hrs)	Evening (Hrs)	Total Hours(Hrs)	
Baseline					
Project					
Air Quality	Reduction of smoke?		Yes	No	
Health	Is there Reduction in Eye irritation?		Yes	No	
	Is there Reduction in Respiratory Problems?		Yes	No	
Fuel Wood Consumption (How long does the fuelwood collected/purchased last?)					
Baseline Scenario (days)		Project Scenario (days)			
Head Load		Head Load			
Cart Load		Cart Load			
Tractor Load		Tractor Load			
Quality of Employment / Livelihood of the Poor / Capacity Building / Income Generation					
Time spent for fuel wood collection		Baseline		After project implementation	
	No. of Hours				
	No. of Members	M→	W→	M→	W→
	Frequency				
	Mode of Collection				
	Purchase (Qty)				
	Amount (Rs/Mode)				
How is the saved time spent now?					

Signature of the Interviewer:

Signature of the Interviewee: