




Verification and certification report form for CDM project activities

(Version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the verification and certification report form for CDM project activities" at the end of this form.

VERIFICATION AND CERTIFICATION REPORT

Title of the project activity	Social Education and Development Society (SEDS) Biogas CDM project for the rural poor
Reference number of the project activity	3541
Version number of the verification and certification report	01
Completion date of the verification and certification report	03/05/2016
Monitoring period number and duration of this monitoring period	3 rd Monitoring Period 01/05/2014 to 31/10/2015 (including both day)
Version number of monitoring report to which this report applies	03
Crediting period of the project activity corresponding to this monitoring period	01/01/2011 – 31/12/2017 (Renewable)
Project participant(s)	M/s. Social Education and Development Society (SEDS) & Evangelisches Werk für Diakonie und Entwicklung e.V.
Host Party	India
Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope 1, Energy industries (renewable-/non-renewable sources) AMS.I.E – "Switch from Non-Renewable Biomass for Thermal Applications by the User" ver.1
Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD	24,463 tCO ₂ e
Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period	17,443 tCO ₂ e
Name of DOE	KBS Certification Services Pvt. Ltd
Name, position and signature of the approver of the verification and certification report	 Kaushal Goyal Managing Director

SECTION A. Executive summary

KBS has been commissioned by “Social Education and Development Society (SEDS)” to perform an independent verification of its registered CDM project “Social Education and Development Society (SEDS) Biogas CDM project for the rural poor”, UNFCCC Ref# 3541 for the reported GHG emission reductions for the given monitoring period 01/05/2014 - 31/10/2015 (both dates included). The CDM projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs)

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered PDD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

Scope:

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

- (a) The registered PDD, including the monitoring plan and the corresponding validation opinion(s);
- (b) Previous verification reports, deviation requests, requests for revision of monitoring plan;
- (c) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- (d) The applied monitoring methodology;
- (e) The applied standardized baseline (if applicable);
- (f) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- (g) All information and references relevant to the project activity's resulting in emission reductions

The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

KBS has, based on the recommendations in the latest version of CDM Validation and Verification Standard, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

Description of project:

The project activity is the installation of biogas plants (digesters) of 2 m³ capacity each for single households in 5 mandals (Penukonda, Roddam, Somandepalli, Gorantla, and Chillamathur) in Anantapur District in Andhra Pradesh State. The biogas units will be fed by cattle dung generated from the households. The biogas stoves will replace the traditional fire wood stoves used for cooking and heating purposes.

In baseline situation, households uses traditional fire wood stove which is inefficient. In the project situation the biogas stoves are used for cooking and hence completely avoiding the usage of traditional stoves which results in savings in non-renewable biomass. Thereby, it avoids the related CO₂ emission from the avoidance of non-renewable biomass in cooking. The PP planned to install biogas units in 5,000 households in which 4,475 units were commissioned at the end of this monitoring period ie, 31/10/2015.

Methodology:

KBS follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available at UNFCCC website as per CDM procedures. A desk review of the project documentation is undertaken, which is followed by an onsite visit by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and version 9 of CDM VVS, to capture the assessment of applicable CDM requirements viz., version 9 of CDM Project Standard, registered PDD, applied methodology/ies, applied standardized baseline and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team

members and the nonconformities, if any. The verification protocol is an internal document, and is available on request. Following are the major milestones for the verification under consideration.

Verification contract	02/12/2015
Publication of MR	04/01/2016
On site verification	09/02/2016 & 10/02/2016
Draft Verification Report	26/02/2016
Final Verification Report	03/05/2016

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader, Technical Expert and Local Expert	IR	Narendra Kumar	R	Central Office	x	x	x	x

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Puratchikkanal	Ma Paa	Central Office
2.	Expert to TR	IR	Pal	Kaushik	Central Office
3.	Manager (Technical & Certification)	IR	Sharma	Chetan	Central Office
4.	Approver	IR	Goyal	Kaushal	Central Office

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Transfer of data from sampling survey sheet to excel ER spreadsheet	Low	Possible human error during transfer of data to ER spreadsheets and MR	Thorough cross-check required on the transfer of data to the ER spreadsheet and MR.
2.	Wrong data collection/misinterpretation of household situation	Low	It is not complicated monitoring process. Appropriate trainings are conducted for the monitoring personnel.	By means of site visit check of actual situation to sample number of households.

C.2. Consideration of materiality in conducting the verification

>>

The prescribed thresholds for materiality, as per §361 of VVS V9.

Prescribed range of ERs/annum	500,000+	300,000+ to 500,000	300,000	SSC PAs	MSC PAs
Prescribed Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The identified/selected materiality threshold for the project activity under current monitoring period is 5% as project activity is small scale project activity.

	MR Version (Draft)	MR Version (Final)
Emission reductions/annum	17,485 tCO ₂ e	17,443 tCO ₂ e
Identified Threshold	5.0%	5.0%

The impact of errors observed during verification for each monitoring parameter on the emission reduction calculation is provided below:

Parameter	Verification approach	Error identified	Corrected	Within Threshold
Biogas Units constructed	Complete data check	No error identified	NA	Yes
Number of biogas plants operating	Complete data check	No error identified	NA	Yes
Confirmation that non-renewable biomass of By has been substituted	Acceptance sampling	No error identified	NA	Yes
Non-usage of biogas plants	Complete data check	Refer CAR-02	Yes	Yes
Diversion of non-renewable biomass saved under the project activity by non-project households	Not verified as default value is used.	NA	NA	Yes

SECTION D. Means of verification

D.1. Desk review

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section 'Appendix 3' of this report.

D.2. On-site inspection

Duration of on-site inspection: 09/02/2016 to 10/02/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening Meeting, Office Inspection, Verification of monitoring records, interviews and database inspection	SEDS office	09/02/2016 & 10/02/2016	R Narendra Kumar
2	Visit to sampled of households	Beneficiary households	09/02/2016 & 10/02/2016	R Narendra Kumar

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Joshua	Manil Jayasena	SEDS	09/02/2016 & 10/02/2016	<ul style="list-style-type: none"> - General aspects of the project - Changes since validation / previous verification - Remaining issues from validation/ previous verification - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data analysis 	Narendra Kumar R
2	Joshua	Rohith	SEDS	09/02/2016 & 10/02/2016		
3	G	Kasi Viswantha Rao	SEDS	09/02/2016 & 10/02/2016		
4	P	Nagamani	SEDS	09/02/2016 & 10/02/2016		
5	S	Tanveer	SEDS	09/02/2016 & 10/02/2016		
6	Padman abha	Sudha	FCN	09/02/2016 & 10/02/2016	<ul style="list-style-type: none"> - Data Analysis - Issues in the MR - ER calculation 	Narendra Kumar R
7	P	Pakirappa	SEDS	09/02/2016	<ul style="list-style-type: none"> - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the Monitoring - Maintenance 	Narendra Kumar R
8	M	Anjinappa	SEDS	09/02/2016		
9	S G	Govindamma	SEDS	09/02/2016		
10	K	Vijay Kumar	SEDS	10/02/2016		
11	U	Nagabhushana	SEDS	10/02/2016		
12	M	Rathnamma	SEDS	10/02/2016		
13	G	Anand	SEDS	10/02/2016		
14	-	Shobha	Seshapuram	09/02/2016		
15	-	Buddamma	Seshapuram	09/02/2016	<ul style="list-style-type: none"> - Verification of data collected through survey 	Narendra Kumar R
16	G	Parimalamma	Seshapuram	09/02/2016		
17	-	Sujathamma	Seshapuram	09/02/2016	<ul style="list-style-type: none"> - Awareness about ownership of CERs - Working condition of bio-digester unit 	
18	B	Lakshmidevi	Kalipi	09/02/2016		
19	G	Lakshmidevi	Kalipi	09/02/2016		
20	T	Hanumakka	Kalipi	09/02/2016		

21	T	Ramanjinamma	Kalipi	09/02/2016	- SD parameters verification
22	J	Yamini	Kondapuram	09/02/2016	
23	-	Ramalakshmi	Kondapuram	09/02/2016	
24	-	Hanumakka	Kondapuram	09/02/2016	
25	-	Obulamma	Kondapuram	09/02/2016	
26	-	Sreedevi	Chinnapareddi palli (P)	09/02/2016	
27	-	Arunamma	Chinnapareddi palli (P)	09/02/2016	
28	-	Jayamma	Chinnapareddi palli (P)	09/02/2016	
29	-	Sushila	Chinnapareddi palli (P)	09/02/2016	
30	S	Ramakrishnamma	Nallagondrayu nipalli	09/02/2016	
31	G	Venkatalakshmi	Nallagondrayu nipalli	09/02/2016	
32	H	Tulasamma	Nallagondrayu nipalli	09/02/2016	
33	H	Sowbhagya	Nallagondrayu nipalli	09/02/2016	
34	-	Prameela	Velagamekala palli	10/02/2016	
35	-	Akkamma	Velagamekala palli	10/02/2016	
36	-	Ashwathamma	Velagamekala palli	10/02/2016	
37	B	Ramadevi	Singireddipalli	10/02/2016	
38	B	Obulamma	Singireddipalli	10/02/2016	
39	K	Lakshmidevi	Singireddipalli	10/02/2016	
40	K	Eswaramma	Singireddipalli	10/02/2016	
41	B	Sarojamma	Gangadevipalli	10/02/2016	
42	-	Padmavadamma	Gangadevipalli	10/02/2016	
43	-	Narayanamma	Gangadevipalli	10/02/2016	
44	-	Anjinamma	Gangadevipalli	10/02/2016	
45	V	Lakshiminarasamma	Kambalapalli (C)	10/02/2016	
46	M	Manjulamma	Kambalapalli (C)	10/02/2016	
47	-	Sujathamma	Kambalapalli (C)	10/02/2016	
48	-	Arunamma	Kambalapalli (C)	10/02/2016	
49	-	Sivamma	Kambalapalli (C)	10/02/2016	
50	L	Manjulamma	Tekuldo	10/02/2016	
51	B	Nirmalamma	Tekuldo	10/02/2016	
52	B	Sujathamma	Tekuldo	10/02/2016	

D.4. Sampling approach

During the on-site verification a sampling approach has been used by the verification team to verify the reported values for the monitored parameters as listed in section D.2 of the MR and stated in above table. The sampling approach included households which have been included in the monitoring survey by the PP as well households which have not been included in this survey. Further the DOE also conducted visits to sample number of non-project households as stated above. The sampling approach considered for each parameter is mentioned below:

Parameters	Total Population	PP's sample size	Acceptance sample size	Sampling method used
Confirmation that non-renewable biomass of By has been substituted	4475	2014 – 78 2015 - 82	25	Simple random sample

D.5. Clarification requests, corrective action requests and forward action requests raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	-	-
Compliance of the project implementation with the registered PDD	3	-	-
Post-registration changes	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	2	-
Total	3	2	-

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	Verification team checked the monitoring report with latest version of MR available in the UNFCCC website (ie, version 5.1) and "Instructions for filling out the monitoring report form" mentioned as attachment to Monitoring report form (version 05.1).
Findings	No CAR/CL is raised
Conclusion	Verification team confirms that final monitoring report is completed using the latest valid version of the applicable monitoring report form/9/.

E.2. Remaining forward action requests from validation and/or previous verification

Verification team checked validation report/4/ and verification report of 1st & 2nd Monitoring periods/5/ and found that no FAR has been raised.

E.3. Compliance of the project implementation with the registered project design document

Means of verification	<p>The verification team determined the conformity of the actual project activity and its operation with the validated project design document. Verification team has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the validated PDD/3/ are in place, and that the project participants have operated the CDM project activity as per the validated PDD/3/ .</p> <p>The verification team has checked the information in the monitoring report and compared against the registered / revised PDDs.</p> <p>During the onsite inspection, the verification team has checked the project locations, implementation, technology applied, project equipment, and monitoring system against the information in the approved PDD. Interviews with operational</p>
------------------------------	---

	personnel and households and random samplings have been carried out.
Findings	CL-01,CL-02 & CL-03 are raised
Conclusion	The verification team has reviewed the biogas units commissioning records, application forms, end user agreements/4/ and non-working & repair log records/18/. The verification team has observed at the site that all physical locations of the biogas units and found that the details are correctly matching with the monitoring report and monitoring records maintained by PP. Thus the verification team concludes that the project activity was implemented and operated as per validated PDD. The verification team, based on the site visit and document review, was able to conclude that the project activity has been commissioned and implemented as per the validated PDD/3/ and that all physical features of the project are in place.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

No temporary deviation from registered monitoring plan or monitoring methodology is sought.

E.4.2. Corrections

No correction in the PDD is sought since registration of the project activity.

E.4.3. Changes to the start date of the crediting period

No change in start date of crediting period is sought.

E.4.4. Inclusion of a monitoring plan to a registered project activity

Not applicable as the PP provided the monitoring plan in registered PDD itself.

E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

No permanent change from registered monitoring plan or monitoring methodology is sought.

E.4.6. Changes to the project design of a registered project activity

PP applied for change in project design. This change includes change in project implementation area. As per the initial registered PDD, digesters are planned to be implemented in 121 villages which is changed to 250 villages in PRC applied. The PRC was approved by EB on 11/07/2013.

E.4.7. Types of changes specific to afforestation and reforestation project activities

Not applicable

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	The verification team checked compliance of project monitoring plan with the applied methodology (AMS I.E, version 01) and including applicable tools.
Findings	No CAR/CL is raised
Conclusion	All parameters stated in the monitoring plan and the applied methodology has been fulfilled in the current monitoring report. All baseline emission parameters has been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the registered PDD is in accordance with the applied methodology. In the opinion of the verification team the monitoring report complies with the requirement of the registered PDD/3/ and applied methodologies (AMS I.E)/6/ in the

context of the project activity. Thus, it conforms to the requirement of §386 of VVS V9/12/.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	The verification team has checked the ex-ante parameters and data stated in Section D.1 of MR and compared with section B.6.2 of the registered PDD whether all parameters fixed ex-ante for the crediting period have been applied correctly.		
	Ex-ante Parameter	Value	Consistent with the PDD/3/ & the source mentioned in it
	Rating of Biogas	1.78 kW/digester	Yes
	B_v	3.37 tonnes/year/family	Yes
	f_{NRB, v}	90% or 0.90	Yes
	NCV_{biomass}	0.015 TJ/tonne	Yes
	EF_{projected fossilfuel}	71.5 tCO ₂ /TJ	Yes
Findings	No CAR/CL is raised		
Conclusion	The values of ex ante fixed parameters have been verified from the registered PDD/3/. Same has been crosschecked with the source mentioned in the PDD and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.		

E.6.2. Data and parameters monitored

Means of verification	<p>The verification team has determined whether the registered monitoring plan has been properly implemented and followed by the PP that the monitoring has been carried out in accordance with the registered monitoring plan; and determined whether all parameters including project emission parameters, baseline emission parameters and leakage parameters used for emission reduction calculation stated in the registered monitoring plan are monitored or used appropriately as per the registered PDD.</p> <p>During the verification all monitoring parameters listed in Section D.2 of MR were compared with section B.7.1 of the registered PDD have been verified with regard to the:</p> <ul style="list-style-type: none"> (i) appropriateness of the applied measurement / determination method, (ii) the correctness of the values applied for ER calculation, (iii) the accuracy, and applied QA/QC measures. <p>The monitored values are assessed as follows:</p> <p>Biogas Units constructed (<i>Number of biogas units constructed</i>): This parameter is monitored as and when a digester is commissioned/started producing gas and the same is entered into the records of SEDS. The reported data is cross checked with the online monitoring solution/14/ maintained in SEDS office during site visit. The value reported in the monitoring report (ie, 4,475) is found to be correct.</p> <p>Number of biogas plants operating (Number of plants operating in year): PP will repair the plants as and when an issue is found by staff or reported by end user. So, PP continuously monitors the non-working days when the unit is not operational. The emission reduction will be adjusted based on the non-working days. Hence, the number of biogas units constructed is considered as number of biogas plants operating. Hence, the value reported for this parameter (ie, 4,475) is correct.</p> <p>Confirmation that non-renewable biomass of B_v has been substituted (<i>Confirmation that non-renewable biomass has been substituted</i>): This parameter was monitored through annual sample survey. PP has conducted survey during the year 2014 & 2015 in 76 households selected randomly in each year/15/. As verified from the survey result/15/, all the sample households confirm that the bio digester usage substitute non-renewable biomass used in the baseline situation. All the survey sheets/15/ are verified and found that the data mentioned in the excel sheet is correct. During the site visit verification team has done acceptance sampling</p>
------------------------------	--

	<p>survey where verification team conducted survey in 25 households (randomly selected from PP's sample population). All the data collected are consistent with PP's record/15/. No error found. Hence, the verification team confirms that the non-renewable biomass of By has been substituted by the project activity.</p> <p>Non-usage of biogas plants (<i>Usage of non-renewable biomass in case of non-performance of biogas units</i>): Non-usage days of biogas plants are monitored through continuous monitoring. When the biogas unit is not working, the same will be noticed by SEDS staffs/village volunteers through regular monitoring or from the complaint made by the end-user. The date when the plant stopped working and the date when the issue is fixed are noted down in the village level breakdown log book/18/ by the staffs/volunteers and the same will be entered into monitoring solutions/14/. Verification team checked all the breakdown log records/18/ and data in the monitoring solution/14/. The entire breakdown data reported in the ER sheet/2/ are checked and found few errors. CAR-02 is raised in this regard and the same is closed after the necessary corrections are done by PP. Verification team confirms the data reported in the revised MR (ie, 84700 non-usage days) is found to be correct.</p> <p>Diversion of non-renewable biomass saved under the project activity by non-project households (<i>Diversion of non-renewable biomass saved under the project activity by non-project households</i>): PP is monitored through annual sample survey conducted during 2014 & 2015. As per the survey results/16/ no diversion of non-renewable biomass saved under the project activity by non-project households. However, PP has considered 5% leakage as per the latest version of the methodology (AMS I.E, version 5). As per the latest version, if PP apply 5% leakage (ie, using the adjustment factor of 0.95) then monitoring of the leakage is not necessary. Hence, verification team accepts the usage of adjustment factor of 0.95 and hence not verified the survey results.</p>
Findings	CAR-02 is raised
Conclusion	<p>Corresponding to the §389 of VVS V9/12/, the team confirm that the monitoring has been carried out in accordance with the approved PDD/3/.</p> <p>The monitoring system is in compliance with the information flow for the parameters as mentioned in monitoring plan in approved PDD/3/. The monitored data for the parameters has been verified by checking the procedure for information flow and found to be complete and consistent.</p>

E.6.3. Implementation of sampling plan

<p>Means of verification</p>	<p>The verification team checked whether the PPs have applied a sampling approach to determine the monitored values. For the parameters determined through sampling, the verification team checked the sampling approach followed for each monitoring parameters to confirm the sampling plan mentioned in the registered PDD.</p>										
	<p>The following parameters are monitored through sampling:</p>										
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Sample size required as per PDD/3/</th> <th>Actual sample size considered for survey/1/</th> <th>Is sample size is sufficient?</th> </tr> </thead> <tbody> <tr> <td>Confirmation that non-renewable biomass of By has been substituted</td> <td>No details provided</td> <td>76 (for 2014) 76 (for 2015)</td> <td>Yes. Since the PDD does not specify the sample size requirement, the sample size calculated based on 90/10 confidence & precision level seems to be acceptable. Moreover PP has considered more sample than required.</td> </tr> </tbody> </table>	Parameter	Sample size required as per PDD/3/	Actual sample size considered for survey/1/	Is sample size is sufficient?	Confirmation that non-renewable biomass of By has been substituted	No details provided	76 (for 2014) 76 (for 2015)	Yes. Since the PDD does not specify the sample size requirement, the sample size calculated based on 90/10 confidence & precision level seems to be acceptable. Moreover PP has considered more sample than required.		
Parameter	Sample size required as per PDD/3/	Actual sample size considered for survey/1/	Is sample size is sufficient?								
Confirmation that non-renewable biomass of By has been substituted	No details provided	76 (for 2014) 76 (for 2015)	Yes. Since the PDD does not specify the sample size requirement, the sample size calculated based on 90/10 confidence & precision level seems to be acceptable. Moreover PP has considered more sample than required.								
<p>Verification team has conducted acceptance sampling to verify the parameter monitored through sampling. The verification team calculated the minimum sample size (n) as 22 and acceptance number (c) as 1 (considering AQL - 1%, UQL - 20%, producer risk – 5% & consumer risk – 5%). Verification team has done survey in</p>											

	randomly in 25 numbers of households (selected from the PP's sample population) and verified the PP's survey data.
Findings	No CAR/CL is raised
Conclusion	<p>Verification team concludes the following:</p> <ul style="list-style-type: none"> • The sample size considered for the parameter (which is monitored through sampling basis) is found to be appropriate • PP's sample population was selected in all the mandals proportionally based on the number units installed in the respective mandals. • The sampling plan is implemented seems to be appropriate. • Through acceptance sampling, the verification team confirmed that the all the data collected by PP through sample survey are correct. No error found.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Not applicable as no monitoring equipments involved.
Findings	NA
Conclusion	NA

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>As per the methodology the emission reduction is directly calculated. Baseline & project emissions are not calculated separately.</p> <p>The verification team has checked whether calculations of GHG emission reduction calculation have been carried out in accordance with the formulae and methods described in the registered monitoring plan. In detail the following has been verified:</p> <p><u>Transparency:</u> It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae.</p> <p><u>Parameter consistency:</u> It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet.</p> <p><u>Correctness:</u> It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology.</p> <p><u>Completeness:</u> It has been checked whether all calculations are complete and without omissions</p> <p>The equations applied for the determination of GHG emissions reduction is consistent with the registered PDD and applied methodology: The emission reduction is calculated using the formula:</p> $ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel}$ <p>Emission reduction is adjusted with 0.95 factor for leakage (considering 5% leakage) as per the latest version of methodology AMS I.E, version 5)</p> <p>PP has submitted the emission reduction calculation in the excel sheet/2/. The calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the approved PDD/3/ and the selected methodology/6/.</p>
Findings	CAR-02 is raised.
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> • The calculations of baseline GHG emissions have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology. • The emission factor applied is an ex-ante value valid for the fixed crediting period. • Any assumptions used in emission or removal calculations have been justified. • Appropriate emission factor and other reference values have been correctly applied. It can be confirmed that the emission reduction calculation is

	<p>correct.</p> <ul style="list-style-type: none"> The ER calculation sheet/2/ provided is clear, transparent and the calculations provided in the sheet are reproducible. Hence, the emission reduction reported in the monitoring report/1/ for the monitoring period (ie, 18,361 tCO₂e without leakage adjustment and 17,443 tCO₂e with leakage adjustment) is verified to be correct
--	--

E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	Not applicable as the emission reduction is directly calculated. No project emission is calculated. This is as per the registered PDD & selected methodology.
Findings	NA
Conclusion	NA

E.8.3. Calculation of leakage GHG emissions

Means of verification	<p>During the verification it has been checked whether leakage emissions have to be considered and in cases where leakage emissions have to be calculated, the respective calculation of leakage GHG emissions has been checked.</p> <p>As per the leakage survey results no diversion of non-renewable biomass saved under the project activity by non-project households. However, PP has considered 5% leakage as per the latest version of the methodology (AMS I.E, version 5). As per the latest version, if PP apply 5% leakage (ie, using the adjustment factor of 0.95) then monitoring of the same is not necessary. Hence, verification team accepts the usage of adjustment factor of 0.95 and hence not verified the survey results.</p>
Findings	No CAR/CL is raised
Conclusion	The PP has applied 0.95 leakage adjustment factor in emission reduction which is acceptable considering the provision in the latest version of the methodology (AMS I.E, version 5). Verification teams also confirms applying the adjustment factor is conservative since the no leakage is identified through sample survey conducted with non-project households. The leakage estimated in the MR (ie, 918 tCO ₂ e) is found to be correct.

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	<p>Section E.4 of MR demonstrate the summary of GHG emission reductions for the monitoring period and calculated according to the applied methodologies as follows:</p> $ER_y = BE_y - PE_y - L_y$ $= 18,361 - 0 - 918 = 17,443 \text{ tCO}_2\text{e}$ <p>The ER calculation sheet and monitoring report is verified to check the calculation.</p>
Findings	No CAR/CL is raised
Conclusion	<p>The verification team confirms the following:</p> <ul style="list-style-type: none"> The emission reduction value reported (ie 17,443 tCO₂e) is verified to be correct. The summary table in the MR has been filled correctly and the values are in line with the related emissions reduction spreadsheet. Since the full monitoring period starts after 31/12/2012, the complete verified emission reductions are correctly reported under the respective column in the MR.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	<p>The verification team has checked whether the MR includes a comparison of actual values of the monitoring period with the estimations in the registered PDD/3/. Section E.5 of the MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the registered PDD</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">Emission reduction estimated as per the approved PDD/3/</td> <td style="width: 50%;">Actual emission reduction achieved as per Monitoring report/1/</td> </tr> <tr> <td>24,463 t CO₂e</td> <td>17,443 t CO₂e</td> </tr> </table> <p>Hence, the actual emission reduction achieved during the monitoring period is</p>		Emission reduction estimated as per the approved PDD/3/	Actual emission reduction achieved as per Monitoring report/1/	24,463 t CO ₂ e	17,443 t CO ₂ e
Emission reduction estimated as per the approved PDD/3/	Actual emission reduction achieved as per Monitoring report/1/					
24,463 t CO ₂ e	17,443 t CO ₂ e					

	28.7% less than the estimation in the PDD.
Findings	CAR-01 is raised
Conclusion	The estimated emission reduction as per PDD and the actual emission reduction achieved for the monitoring period are correctly reported in the section E.5 of MR. The actual achieved emission reduction is 28.7% less than the PDD estimation. Hence no justification is required.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	No CAR/CL is raised
Conclusion	The actual achieved emission reduction is 28.7% less than the PDD estimation. Hence no justification is required.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has determined the CER achieved during first commitment period and second commitment period
Findings	No CAR/CL is raised
Conclusion	Since the complete monitoring period falls after the first commitment period, the complete emission reductions are correctly reported under the respective column in the MR.

SECTION F. Internal quality control

The draft verification report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by KBS are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Manager Technical and Certification. The technical reviewer and Manager (Technical & Certification) can be same person.

The final decision is authorized by Managing Director, KBS once the report is approved by the Manager (Technical & Certification).

SECTION G. Verification opinion

The verification team confirms that the the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification and on site visit, the data submitted by PP was cross verified with the values mentioned in the emission reduction sheet/2/ and monitoring report/1/. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the approved revised PDD/3/.

Evidences (Documents/interview/site visit) referred for verification of individual monitoring parameter and fixed parameters are defined in section E.6 above. It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in Appendix 3 of this report.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 17,443 tCO₂e emission reductions during period 01/05/2014 -31/10/2015.

SECTION H. Certification statement

KBS Certification Services Pvt. Ltd. has been contracted by 'M/s Social Education and Development Society (SEDS)' to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the CDM Project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" and UNFCCC Reference Number 3541 for the monitoring period

01/05/2014 -31/10/2015 (including both dates) in the Monitoring Report Version 01 (first version) dated 20/12/2015.

The verification is based on the approved revised PDD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.

The management of the ‘Social Education and Development Society (SEDS)’ is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report Version 03 dated 02/05/2016. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the ‘Social Education and Development Society (SEDS)’. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 03 dated 02/05/2016.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 01/05/2014 -31/10/2015 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 03 dated 02/05/2016 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

KBS confirms the following;

Reporting period: 01/05/2014 -31/10/2015 (including both dates)

Verified and certified emission in the above reporting period:

	Amount	Unit
Baseline emissions (BE)	18,361	tCO ₂ e
Project emissions (PE)	0	tCO ₂ e
Leakage emissions (LE)	918	tCO ₂ e
Certified emission reductions (CERs)	17,443	tCO ₂ e

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CERs	Certified Emission Reductions
CH4	Methane
CL	Clarification Request
CO2e	Carbon dioxide equivalent
COP	Conference of Parties
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERPA	Emission Reduction Purchase Agreement
ERs	Emission Reductions
FAR	Forward Action Request
FCN	Fair Climate Network
GHGs	Greenhouse Gas(es)
GWP	Global Warming Potential
HH	Household
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KBS	KBS Certification Services Pvt. Ltd.
KP	Kyoto Protocol
LE	Leakage Emissions
MR	Monitoring Report
MP	Monitoring Plan
NGO	Non Governmental Organisation
PE	Project Emissions
PDD	Project Design Document
PS	Project Standard
PCP	Project Cycle Procedure
PPA	Power Purchase Agreement
SEDS	Social Education and Development Society
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VLV	Village Level Volunteers
VVS	Validation & Verification Standard

Appendix 2. Competence of team members and technical reviewers

Personnel Name:		Narendra Kumar	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert	<input checked="" type="checkbox"/>

Area(s) of Technical Expertise	
Sectoral Scope	Technical Area
Energy Industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar
Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
Energy Demand	TA 3.1: Energy Demand
Approved by (Manager C& T)	Akhilesh Joshi
Approval date:	16/01/2016

Personnel Name:		M.P. Kanal	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources		
Energy demand	TA 3.1. Energy Demand		
Waste Handling and Disposal	TA 13.1 Waste Handling and Disposal		
Agriculture	TA 15.1 Agriculture		
Approved by (Manager C & T)	Gagandeep Kakkar		
Approval date:	03/11/2015		

Personnel Name:		Kaushik Pal	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy Industries (renewable/non-renewable)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2 Energy generation from renewable energy sources		
Energy Demand	TA 3.1 Energy Demand		
Approved by (Manager C & T)	Gagandeep Kakkar		
Approval date:	31/12/2014		

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	SEDS	Monitoring Report,	Version 01, dated	SEDS

			20/12/2015	
	SEDS	Monitoring Report,	Version 02, dated 04/04/2016	SEDS
	SEDS	Monitoring Report	Version 03, dated 02/05/2016	SEDS
2	SEDS	ER Calculation Sheet	Version 01, dated 20/12/2015	SEDS
	SEDS	ER Calculation Sheet	Version 02, dated 04/04/2016	SEDS
3	SEDS	Registered PDD (PRC Approved)	Version 8, 26/03/2013	Publicly available
4	TUV Nord	Validation Report	Dated 22/03/2010	Publicly available
5	DNV	PRC Validation Report	Dated 17/04/2013	Publicly available
6	UNFCCC	AMS.I.E – “Switch from Non-Renewable Biomass for Thermal Applications by the User”	Version 01	Publicly available
7	IPCC	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	Web Link	Publicly available
8	UNFCCC	Kyoto Protocol (1997)	Web Link	Publicly available
9	UNFCCC	Monitoring Report Form (CDM-MRFORM)	Version 05.1	Publicly available
10	UNFCCC	CDM Project Standard	Version 09	Publicly available
11	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	Version 05	Publicly available
	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities	Version 04	Publicly available
12	UNFCCC	CDM Validation and Verification Standard	Version 09	Publicly available
13	UNFCCC	Glossary “CDM terms”	Version 08	Publicly available
14	SEDS	Biogas basic record set: - Biogas application form - End user agreement for CER ownership - Completion certificate - Online monitoring solution		SEDS
15	SEDS	Sample survey monitoring sheets for the year 2014 & 2015	-	SEDS
16	SEDS	Non-project household survey sheets for the year 2014 & 2015	-	SEDS
17	SEDS	Training Records: - Training conducted for end user - Training conducted for Mason - Training conducted for staffs Training conducted for Village Level Volunteers	-	SEDS
18	SEDS	Village level plant breakdown log sheets maintained by village level volunteers	-	SEDS
19	SEDS	Photographs and end user details for the biogas units constructed during previous monitoring period but not considered for the emission reduction during the previous monitoring periods.	-	SEDS

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	01	Section no.		Date: DD/MM/YYYY
Description of FAR				
NA				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	Section no.	E.3	Date: 26/02/2016
Description of CL				
MR-Section A.1: It is mentioned that the start date of construction of the first biogas unit is 04/01/2011 and commissioning of first biogas plant is on 04/03/2011. However, these dates are not consistent with the details mentioned in the ER calculation sheet. Clarify Similarly the number of biogas units commissioned during the 1 st and 2 nd monitoring period is not consistent with the ER sheet. Clarify				
Project participant response				Date: 18/04/2016
The start date of construction of first biogas unit and commissioning date of first biogas unit are corrected in the MR now.				
About 234 biogas units that were commissioned during the previous monitoring periods were not reported for emission reduction calculations. This is because, though commissioned, they were not producing enough biogas for cooking due to various structural and construction issues. Although they were using biogas to a very small extent, the communities continued to use fuelwood to a large extent. Hence they were not reported and also not claimed Emission Reductions.				
The commissioning dates for the units are fixed and entered into the SEDS monitoring solution database and the end user agreements were also signed on the dates of commissioning as reported in the ER calculations sheet. Hence the units which were installed and not reported for claiming emission reductions in the previous monitoring periods are featuring during this monitoring period, as only during this monitoring period, the ERs are being claimed.				
The issue of start date and construction date too is also because of this reason. Hence as per the monitoring solution data base, the dates have been corrected in the revised monitoring report.				
This is a conservative approach, as though they were partially using biogas, ERs were not being claimed.				
Documentation provided by project participant				
Photographic evidences with the unit ID and End User agreements of the units.				
DOE assessment				Date: 22/04/2016
The starting date construction and starting date of commissioning are corrected in the MR which is now consistent with the ER Though 234 units were commissioned during previous monitoring periods, those are not considered for the emission reduction during the previous monitoring period due to the operational issues. Since, those issues are shorted out before the starting of this monitoring period and the units are started producing biogas, PP is considering these units from this monitoring period for the emission reduction calculation. This approach seems to be acceptable. Verification team also checked the photographs of the 234 units and confirmed the same with the PP. Hence OK. Finding is closed				

CL ID	02	Section no.	E.3	Date: 26/02/2016
Description of CL				
<u>ER calculation sheet-End-user:</u> It is observed that some names of the end users are changed during this monitoring period. Please provide the reason.				
Also clarify how the end user agreement signed during the installation of plan is still valid				
Project participant response				Date: 18/04/2016
The PP, SEDS is also implementing GHG reduction project in the Agriculture sector. In this regard, the Monitoring Solution has been updated with the families undertaking Sustainable Agriculture. A lot of families with biogas are also undertaking Sustainable Agriculture. In this regard, the End User Names of biogas, usually women, has got replaced with Head of the households for the agriculture project. Thus while drawing the details of the end users for biogas from the monitoring database, for 115 families, the names have got replaced. But the end users have not changed. The monitoring solution has been updated with the names of the beneficiaries with whom the End user agreement has been signed. The biogas monitoring solution has been has also been corrected to the actual end user agreement who have signed the End User Agreement. The households remain the same and there is no change in the households. The families are the same and are using biogas units for their daily use.				
Documentation provided by project participant				
End User Agreements of the families.				
DOE assessment				Date: 22/04/2016
The reason provided by PP is acceptable. However PP has now changed the names are end users back to the names with whom the CER ownership agreement is signed. Hence OK. Finding is closed.				

CL ID	03	Section no.	E.3	Date: 02/05/2016
Description of CL				
<u>MR-Section A.1:</u> It is mentioned that, at the end of this monitoring period 4475 units have been commissioned and 567 are under construction. This accounts total biogas units of 5042 which is more than total biogas units mentioned in the MR (ie, 5000). Clarify				
Project participant response				Date: 02/05/2016
More than 5000 units have been initiated for construction as there will eventually be dropouts during construction or after commissioning. Of the units constructed so far, many of the units have got demolished too, so these constructed units will replace the demolished units eventually. But the total emission reductions will only be claimed for 5000 units after all the units are commissioned. All the remaining units are anticipated to be commissioned by end of June 2016 in phases.				
Documentation provided by project participant				
Revised MR				
DOE assessment				Date: 03/05/2016
As per the response by PP, some excess units of biogas plants are planned considering the dropouts due to major damage and demolition of biogas plants in some households. PP also confirms that for any monitoring period the number of biogas units considered for the emission reduction claim will be limited to 5000 units. This seems to be acceptable. Verification team also confirms that the number of biogas units considered for this monitoring period is only 4475 which is less than 5000. Hence verification team accepts the same. Finding is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	E.8.5	Date: 26/02/2016
Description of CAR				
<u>MR-Front Page:</u> The value of 'estimated amount of GHG emission reductions for this monitoring period in the registered PDD' mentioned is not correct.				
Project participant response				Date: 18/04/2016
The value of estimated amount of GHG emissions reductions for this monitoring period according to the registered PDD has been corrected in the revised Monitoring Report.				
Documentation provided by project participant				

Revised Monitoring Report.	
DOE assessment	Date: 22/04/2016
PP has corrected the value of estimated emission reduction in the revised MR. Finding is closed	

CAR ID	02	Section no.	E.8.1	Date: 26/02/2016
Description of CAR				
ER Calculation sheet-Breakdown log: For the biogas units that breakdown is not fixed yet, the end date considered for the calculation of number of days lost is not correct. This results in lesser breakdown time than actual.				
Project participant response				Date: 18/04/2016
The biogas units that have not yet been fixed, the dates have been corrected to till the end of the monitoring period i.e. 31 st October 2015. Kindly find the revised Emissions Reduction Sheets and the revised Monitoring Report.				
Documentation provided by project participant				
Revised Monitoring Report and Emission Reduction Calculations Sheet				
DOE assessment				Date: 22/04/2016
The breakdown end date (for the units that are not repaired yet) is now corrected by PP. Finding is closed.				

Table 4. FAR from this verification

FAR ID	xx	Section No.		Date: DD/MM/YYYY
Description of FAR				
NA				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	23 March 2015	Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: project activities, verifying and certifying
