VERIFICATION / CERTIFICATION REPORT

"SOCIAL EDUCATION AND DEVELOPMENT SOCIETY (SEDS) BIOGAS CDM PROJECT FOR THE RURAL POOR"

IN

INDIA

(UNFCCC Registration Ref. No. 3541)

Monitoring Period:
1 January 2011 to 31 December 2012

REPORT NO. 2012-3317

REVISION NO. 01

DNV KEMA ENERGY & SUSTAINABILITY

VERIFICATION / CERTIFICATION REPORT

Date of first issue: 22 April 2013	Project No.: PRJC-443317-2013-CCS-IND
Approved by: Hendrik W. Brinks	Organisational unit: DNV KEMA Energy & Sustainability Accredited Climate Change Services
Client: Social Education and Development Society (SEDS)	Client ref.: Manil Jayasena Joshua

DNV CLIMATE CHANGE SERVICES AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 994 774 352 MVA

Summary:

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India " (UNFCCC Registration Ref. No. 3541) for the period 1 January 2011 to 31 December 2012.

In our opinion, the GHG emission reductions reported for the project in the monitoring report (version 2) of 8 April 2013 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology AMS-I.E (version 01) and the monitoring plan contained in the revised Project Design Document version 8 of 26 March 2013.

DNV Climate Change Services AS is able to certify that the emission reductions from the project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India during the period 1 January 2011 to 31 December 2012 amount to 6 043 tonnes of CO_2 equivalent.

Report No.: 2012-3317			Subject Group: Environment	**Indexing terms**
Report title: "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India				Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism Service Area Verification Market Sector Energy Industry
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Work verified by: Indrajit Rana				
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CO_2	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
DNV	DNV Climate Change Services AS
DNA	Designated National Authority
EF	Emission factor
ER	Emission reductions
FAR	Forward Action Request
FCN	Fair Climate Network
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MoC	Modalities of communication
NCV	Net Calorific Value
NRB	Non Renewable Biomass
PDD	Project Design Document
PS	Clean Development Mechanism Project Standard
SEDS	Social Education and Development Society
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

1 INTRODUCTION

Social Education and Development Society (SEDS) has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of emission reductions reported for the CDM project activity 3541 "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India (the project) for the period 1 January 2011 to 31 December 2012. This report contains the findings from the verification and a certification statement for the certified emission reductions.

1.1 Objective

Verification is the periodic independent review and *ex post* determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" for the period 1 January 2011 to 31 December 2012.

1.2 Scope

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD;
- The monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan, including compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

1.3 Description of the project activity

Project Parties:	India (host)
Title of project activity:	Social Education and Development Society (SEDS) Biogas CDM project for the rural poor
UNFCCC registration No:	3541
Baseline and monitoring methodology	AMS-I.E (version 01)

Sectoral scope(s):	Energy industries (renewable - / non-renewable sources) -
Project Participants:	Social Education and Development Society (SEDS)
Location of the project activity:	The project activity (i.e. the individual biogas digesters at households) is spread over 5 Mandals (Roddam, Somandepalli, Penukonda, Chilamathur and Gorantla) of Anantapur district in Andhra Pradesh state, India. Out of the 5 000 biogas plants (digesters) considered in the registered PDD, a total of 2 403 biogas plants have been built and commissioned for the chosen verification period.
Project's crediting period:	1 January 2011 to 31 December 2017 (*Renewable*).
Period verified in this verification:	1 January 2011 to 31 December 2012 (*First*).

1.4 Methodology for determining emission reductions

According to the registered PDD /13/ and the applied methodology AMS-I.E (version 1) /21/the emission reductions for the project are determined as:

$$ER_y = B_y * f_{NRB,y} * NCV_{Biomass} * EF_{projected\_fossilfuel}$$

Where:

ER_y = Emission reductions during the year y in tCO_2e

B_y = Quantity of biomass that is substituted or displaced in tonnes

$f_{NRB,y}$ = Fraction of biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods.

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

$EF_{projected\_fossilfuel}$ = Emission factor for the projected fossil fuel consumption in the baseline. Emission factor of the fossil fuel likely to be used by similar consumers (kerosene) taken 71.5 tCO_2/TJ.

B_y is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year).

There are no project emissions to be accounted in the project activity as per the registered PDD version 06 of 18 March 2010 /13/ and revised PDD final version 8 dated 26 March 2013 /15/.

In accordance with PDD /13/, /15/ and the applied methodology AMS-I.E (Version 01) /21/ the project consider the following potential sources of leakage:
(a) Use/diversion of non-renewable biomass saved under the project activity by non-project households/users who had previously used renewable energy sources, (b) Use of non-renewable biomass saved under the project activity to justify the baseline of other CDM project activities and (c) Increase in the use of non-renewable biomass outside the project boundary to create non- renewable biomass baselines

These leakages were assessed from ex-post surveys of non-project households/users /9/ and areas from where biomass is sourced which does not indicate any need to account for leakages and details of the survey are discussed in sections 3.6 and 3.7 below. The same is in accordance with the PDD /13//15/ and the applied methodology AMS-I.E (Version 01) /21/. In order to be conservative in the estimation of emission of reductions, project participant has accounted for leakages as per latest version 5 of methodology AMS-I. E /25/ for the quantity of biomass that is substituted or displaced by multiplying with a net to gross adjustment factor of 0.95 to account for leakages. This is accepted by DNV as the same is conservative particularly since this is not warranted by the methodology version 01 applicable as per the registered PDD /13/.

The project activity also does not lead to any leakage due to transfer of equipment from another activity or the existing equipment transfer to another activity, as all the biogas plants installed as part of the project activity are newly constructed.

As per the monitoring plan of the PDD, the main parameters monitored include:

i) The number of biogas units constructed as part of the project

ii) Number of biogas plants operating –monitored on a daily basis

iii) Non-usage of biogas plants- monitored on a daily basis .

iv) Confirmation that non-renewable biomass has been substituted, (by annual stratified sample survey).

v) Assessment of diversion of non-renewable biomass saved under the project activity by non- project households (by annual stratified sample survey).

As per the registered PDD, parameters fixed *ex-ante* are:

1. Quantity of biomass that is substituted or displaced in tonnes as 3.37 tonnes/year/family, estimated using baseline survey methods in the registered PDD /13/
2. Fraction of non-renewable biomass as 90% as per the registered PDD /13/
3. Net calorific value of biomass as 0.015 TJ/tonne, as per the registered PDD /13/
4. Emission factor kerosene ($EF_{projected\_fossilfuel}$) as 71.5 tCO_2/TJ as per the registered PDD /13/.

It may be noted that in response to the clarification request /24/, Small-Scale Working Group has clarified that the fraction of non-renewable biomass can be fixed *ex ante* at the beginning of each crediting period and also that the estimate of average annual consumption of woody biomass per appliance (tonnes/year) derived from surveys or historic information in accordance with AMS-I.E can be fixed *ex ante*.

Thus, the emission reductions calculations are in line with the requirements of the methodology, AMS-I.E (Version 01) /21// and the PDD /13/ /15/ .

2 METHODOLOGY

DNV has assessed and determined that the implementation and operation of the project activity, and the steps taken to report emission reductions comply with the CDM criteria and relevant guidance provided by the Board.

The assessment involved a desk review of relevant documentation as well as an on-site visits.

Verification team

				Type of involvement					
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 3.2 competence
Team leader (Verifier)	Ranganathan	Seshan	India	✓	✓	✓	✓		
Verifier	Swarnim	Shilpa	India	✓	✓	✓			
Expert	Namboodiri	Krishnan	India	✓	✓	✓			✓
Technical reviewer	Rana	Indrajit	India					✓	✓

Duration of verification

Monitoring report publication:	8 February 2013 /27/
Desk review:	1 March 2013 to 11 March 2013
On-site assessment:	13 March 2013 to 14 March 2013
Reporting, calculation checks and QA/QC:	15 March 2013 to 22 April 2013

2.1 Desk review

The monitoring report, version 01 dated 28 January 2013 /1/ has been made publicly available on the CDM website.

In addition to the monitoring report (version 1 dated 28 January 2013 and final version 2 dated 8 April 2013) /1/, DNV reviewed:

- The PDD for the project activity (registered version 6 dated 18 March 2010 /13/ and revised final version 8 dated 26 March 2013 /15/)
- The validation report dated 22 March 2010 /14/
- Baseline and monitoring methodology AMS-I.E, version 01 /21/
- Validation opinion for post registration changes in PDD dated 17 April 2013 3 /16/.
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /18//19//20//21//22//23//24/ /25//26/.
- Other information and references relevant to the project activity's resulting emission reductions /2//3//4//5//6//7//8//9//10//10//11//12/.

During the desk review, DNV has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology;
- 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.

2.2 On-site assessment

On 13 and 14 March 2013 DNV performed on-site assessments. During the on-site assessment DNV carried out:

- An assessment of the implementation and operation of the registered project activity is as per the PDD for the project activity (version 6 dated 18 March 2010 and revised version 8 dated 26 March 2013) /13//15/;
- For on site assessment, DNV in line with the monitoring plan of the PDD /15/, the validation report /14/, and as per the sampling guidance from CDM-EB /23/ calculated the sample size for acceptance sampling following Appendix C -"the Best practice examples – acceptance sampling" of above EB guidelines. The sample size was calculated using standard software considering the Acceptable Quality Level of 1% and Unacceptable Quality Level of 10% with alpha and beta at 5%, which worked out to be 61 households, for an acceptance number of 2. Considering that the sample frame is homogenous as the biogas plants are installed in one district only and confirmed from the details of daily monitoring by SEDS /3/, the households to be visited and whose documents to be checked were identified using simple random generation technique. During the site visit all records of the commissioned biogas plants as per the random sample list of 94 households (which include both biogas units covered in the project proponents's sample survey and others) were verified from the documentary evidence /3//4//5/. In addition, DNV auditors visited 98 households and checked the installation and functioning of the biogas units. These 98 households include households that figured in the random sample list and also biogas units in other households in the same villages as that of the random households selected.
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel /28//29//30//31/ to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD/13//15/;
- A cross check between information provided in the monitoring report /1/ and logbooks /4/, database /3/, end use agreements /5/, purchase records /6//7/audit reports/8/;
- A check of monitoring practices against the requirements of monitoring plan
- A review of calculations and assumptions made in determining the GHG data and emission reductions /2/;

- An identification of quality control and quality assurance procedures in place /10/ to prevent or identify and correct any errors or omissions in the reported monitoring parameters

In addition, all parameters required by the monitoring methodology AMS-I.E Version 1 /21/ and the management system were assessed during the site visit.

2.3 Closing out of verification findings

The objective of this phase of the verification was to resolve any issues which needed be clarified prior to DNV's conclusion that i) the project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD, ii) the monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan and iii) the data and calculation of GHG emission reductions are correct.

A corrective action request (CAR) is issued, where:

i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
ii. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
iv. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

The verification identified two CARs and two CLs. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the monitoring (please refer to Appendix A for further details). In addition to the changes made to the monitoring report as a result of the verification findings, the following changes to the monitoring report (version 2 dated 8 April 2013) were made when compared to the initial version of the monitoring report received for verification (version 1 dated 28 January 2013):

- Year wise details of the biogas units commissioned in the year in 2011 and 2012 and reasons for the variation in the estimated value of the emission reduction in registered PDD and that achieved during the current monitoring period in section E.6 of the monitoring report.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" for the period 1 January 2011 to 31 December 2012.

3.1 Remaining issues, CARs, FARs from previous validation / verification

According to the validation report /14//, no CAR, FAR or CL's were required to be closed out during this verification and this is the first verification of the project activity.

3.2 Post registration changes

The post registration changes described in Appendix B were identified by DNV during this verification. These post registration changes were assessed by DNV.

For post registration changes not requiring prior approval by the CDM EB in accordance with Appendix 1 to the CDM Project Standard /19/, the assessment of the changes (in the form of a duly completed "Post-registration changes request form" (F-CDM-PRC) and DNV's assessment opinion on the changes) is submitted together with the revised PDD (version 8 of 26 March 2013) for acceptance by the CDM EB as part of the request for issuance for this monitoring period.

The assessment of compliance with the project description and the monitoring plan contained in the PDD, as described in the following sections, is based on the revised PDD (version 8 of 26 March 2013) /15/.

3.3 Project implementation

As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in the PDD (version 8 of 26 March 2013) /15/.

The project activity involved installation and operation of 5 000 digesters in phases, at individual households and use of biogas produced in biogas stoves for cooking purpose and heating of hot water, replacing the commonly used inefficient wood fired mud stoves technology, thus avoiding the use of non-renewable biomass like the fuel wood from forests and the use of kerosene in the baseline scenario. In accordance with the chosen methodology, AMS-I.E. version 01 /21/ in the absence of the project activity, the baseline scenario would be the use of fossil fuels (kerosene) for meeting similar thermal energy needs /15/.

For the chosen monitoring period, a total of 2 403 digesters have been installed, each of capacity 2 m^3 as per the PDD and as verified from the invoice for the supplies made /7/. These 2 403 biogas units have been considered for in the calculation of emission reductions during this monitoring period. DNV has verified the number of units installed from SEDS monitoring database /3/ and from agreements between SEDS and end users /5/. This 2 403 biogas units as part of the project activity were implemented in villages of 5 mandals of Anantapur district. The first biogas unit was commissioned and started use from 4 March 2011 /3/.

According to the registered PDD, rural households that showed interest and identified upfront for the project activity based on the survey in 2008 were in 121 villages in 5 mandals of Anantapur district. During the course of implementation, the project proponent could not construct biogas for many of the identified beneficiaries due to: (a) migrations of families to neighbouring villages, (b) unsuitable site conditions such as rocky or sandy, which prevents excavation of land to construct the biogas dome, etc. In view of this, the project proponent is considering including interested households from within the project boundary of the 5 mandals in Anantapur district, which will now be spread over 250 villages instead of 121 villages identified earlier. The above could be confirmed during site visit discussions /28//29//30/.

The above mentioned design change was incorporated in the revised PDD version 8 dated 26 March 2013 /15/ and validation opinion on the same is now being submitted to CDM-EB /16/.

As stated in the PDD, prior to the implementation of the project activity, the source of thermal energy in the households was mainly non-renewable biomass (wood) and some kerosene. The implementation of the project activity has resulted in reduction of the consumption of non-renewable biomass and kerosene in individual household where the biogas plants have been installed.

3.4 Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD

The PDD /15/ envisaged installation and operation of 5 000 digesters in 2 phases, at individual households, against which 2 403 digesters have been installed during this monitoring period.

The emission reductions of 6 043 tCO_2 during the current verification period of 1 January 2011 to 31 December 2012 are 75.23% lower compared to the estimated emission reduction of 24 396 tCO_2 for the same period as per the registered PDD.

This variation is due to (i) the lower number of 2 403 biogas digesters installed against 5 000 envisaged as per the PDD, (ii) biogas units commissioned during 2011 were 990 and during 2012 were 1413 only against construction of 2 500 units envisaged each year as per the PDD /13/ and (iii) repair and maintenance of biogas units during this monitoring period leading to 48 026 non-operational biogas days for all installed biogas units together, which contributes to a decrease of 6.3% from the envisaged emission reductions for the monitoring period.

Year	As per registered PDD ERs (tCO_2)	As per monitoring report ERs (tCO_2)
1 January 2011 to 31 December 2012	24 396	6 043
% deviation from PDD		-75.23%

3.5 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the monitoring plan contained in the revised PDD (version 8 of 26 March 2013) /15/ is in accordance with the approved methodology applied by the project activity, i.e. AMS-I.E (version 01) /21/.

3.6 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the PDD of 26 March 2013 /15/.

The monitoring of the project is complete and in accordance with the approved monitoring methodology AMS-I.E, version 01 /21/, and the monitoring plan contained in the PDD /15/. As per the monitoring plan of AMS-I.E version 01, monitoring shall consist of an annual check of all appliances or a representative sample thereof to ensure that they are still operating or are replaced by an equivalent in service appliance. The project proponent monitor field data on a daily basis and the same is entered into the monitoring solution data base /3/.

As required by the monitoring methodology and monitoring plan of the PDD /15/, the following parameters are being monitored.

Baseline emission parameters

1. *Number of biogas units constructed:* This provides the number of biogas plants of 2 m^3 constructed and commissioned since 4 March 2011 when the first unit was commissioned and is sourced from the daily monitored field data entered into monitoring database for each of the unit /3/ as specified in the PDD. As per this 2 403 biogas units have been constructed, 988 in 2011 and 1 415 in 2012, and were operational during this monitoring period from 1 January 2011 to 31 December 2012. This has been cross-checked with the end user agreement signed between the end users and SEDS /5/. The emission reduction calculation /2/ has been done based on the 2 403 biogas units constructed and operational during this monitoring period.

2. Number of biogas plants operating -

Field data monitored on a daily basis by the village level volunteers for all the units constructed and commissioned were recorded in the log books maintained at the village level /4/. Village level volunteers/biogas field workers monitor all biogas units for non-operating and the duration of non-usage with the reason and record the same in filed log book /4/. These data were entered in the digitized monitoring database /3/. Number of days considered for emission reductions during this monitoring period were arrived by deducting the non-usage days from total calendar days. The data of operating days for each and every biogas unit is given in the excel sheet SEDS_ER Calculations.xls /2/. The number of operational days during the monitoring period for each of the biogas unit was determined to estimate the emission reductions. This has been cross checked with the non-operational period for each of the biogas units recorded in the breakdown log book maintained at the village level /4/.

3. Confirmation that non-renewable biomass has been substituted, 90% of 3.37 tonne/family/year i.e. 3.03 tonne/family/year is substituted. (by annual stratified sampling).

Confirmed from sample survey by annual stratified sampling conducted for the year 2011 and 2012 /9/.

Sampling: In order to assess the above, the project participant has chosen stratified random sampling for the project area wherein each five mandals of Anatapur district covered by the project area is a stratum. The total sample size is calculated as per the equation given in the "Guidelines for sampling and surveys for CDM project activities and programme of activities" /23/ assuming a constant proportion value for biogas days operational (0.85) across all five mandals. This is deemed appropriate as the biogas users under the project activity are from rural region having similar socio-economic strata and cooking habits /29//30/. This

proportion value in actual case as per daily monitoring works out to 0.937 and hence the value of 0.85 used by project participant is accepted by DNV as it is conservative for the purpose of sample size estimation.

Sample size has been estimated by the project participant with a 90% confidence and ± 10% precision as per the "Standard for sampling and surveys for CDM project activities and programme of activities" /22/. This gave sample size of 34 for the year 2011 and 35 for year 2012 which corresponds to a sample size of 43 households (for both years), on expecting the response rate from the sampled households to be only 80%.

The number of households in the sample that come from each mandal is arrived by proportional allocation, where the proportions of units from the different mandals in the sample are the same as the proportions in the total population /9//2/. Random sampling was used to identify the sample households from each mandal.

As per the details provided /9/, the actual field study survey included total number of 108 and 167 households in 2011 and 2012 respectively covering all five mandals and hence meets the sampling design mentioned above.

The sample survey include question to confirm whether biogas generated is sufficient for cooking and time spent on cooking. As per the stratified sample survey, the extent of replacement of non-renewable fuel wood is complete /9/ as the sample household confirmed adequacy of biogas for cooking purpose. Few households reported occasional use of renewable biomass for water heating, predominantly species like prosophis juliflora and crop residue which are considered renewable as per Annex 18 of the EB 23 /26/. Further with installation of biogas units, in case of need for additional fuel usage by households, the fire wood to be replaced is the non-renewable one which is the costliest in terms of time spent to collect or purchase and fuel preparation and storage.

4. Non-usage of biogas plants: This is an indicator of usage of non-renewable biomass in case of non-performance of biogas units. Non usage days of biogas units are sourced from the days not used for each of the unit maintained in the digitized monitoring database /3/. Operation of biogas units were monitored on a day to day basis by the village level volunteers and non-operational period of each biogas unit were captured in the log book at the village level /4//and also entered into the monitoring solution for all the biogas units /3/. This ensures that whenever any biogas units were not to be in operation due to repair and maintenance etc., the days of no operations are recorded for each of the unit in the monitoring solution for all the biogas units. The operational days in a year for a biogas unit are calculated as difference between 365 days and non-operational days. For this verification period biogas units repaired/under repair contributes to number of total non-operating biogas days of comes to 48 026 (sum of operating days lost for all 2 403 biogas units given in column "N" of spread sheet on "non-usage data" /2/). The non-operational days has been cross checked against daily log book records for monitoring of biogas units maintained by village level volunteers /4/.

Leakage emission parameters;

a) *Diversion of non-renewable biomass saved under the project activity by non project Households*-. According to the ex-post annual sample survey of non-biogas user families in

the project area conducted during the year 2011 and 2012 /9/, there is no diversion of non-renewable biomass saved under the project activity by non-project households.

Sampling: In order to assess the above, the project participant has chosen stratified random sampling for the project area wherein each five mandals of Anatapur district is considered as a stratum. The total sample size is calculated using the equation for sample size of infinite population available in public domain /17/ assuming a proportion value for the percentage of population picking a choice (renewable or non-renewable biomass biogas) as 0.5.

Sample size has been estimated by the project participant with a 90% confidence and ± 10% precision as per the "Standard for sampling and surveys for CDM project activities and programme of activities" /21/. The sample size thus arrived is 68 per year. The proportions of units from the different mandals in the sample are used the same as the proportions in the total population and sample households from each mandal are identified by random sampling.

As per the details provided /9/ the actual field study survey included total number of 170 and 224 households in 2011 and 2012 respectively covering all five mandals and hence meets the sampling design mentioned above.

The sample survey include question to confirm that after the project activity implementation there is: (i) no increase in fuel wood usage, (ii) no replacing of crop residue with fuel wood and (iii) no increase in cut and carry of fuel wood. This confirms that there is no leakage related to diversion of non-renewable biomass saved under the project activity by non-project households/ users who previously used renewable energy sources.

However, a net to gross adjustment factor of 0.95 to account for leakages (based on the latest version of AMS-I.E methodology, Version 5) /25/ has been applied by the project participant to be conservative in calculations.

The below tables describe for each parameter, which is to be measured according to the monitoring plan, how DNV has verified that i) the actual monitoring complies with the monitoring plan and that ii) data have been assessed to correctly support the emission reductions being claimed.

	Assessment/ Observation	Assessment/ Observation
Data / Parameter: (as in monitoring plan):	Biogas units constructed	Number of biogas plants operating
Measuring frequency:	Continuous	Continuous
Reporting frequency:	Daily	Field data monitored on a daily basis and entered into monitoring data base
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	Yes.
Type of monitoring equipment:	There is no monitoring equipment to measure this parameter. Construction processes were monitored on a day to	There is no monitoring equipment to measure this parameter. Field data monitored on a daily basis for all biogas

	day basis. Data from initiation of construction to commissioning for each of the biogas units are entered in the database maintained by SEDS /3/.	units by village level volunteers. During this monitoring period, the biogas systems were monitored on a day to day basis for non-operational days by the village level volunteers. The non-operating days are recorded in the field log book /4/ and also entered into the SEDS database for all the biogas units /3/
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable as no monitoring equipment is involved for monitoring the parameter.	Not applicable as no monitoring equipment is used for monitoring of this parameter.
Calibration frequency /interval:	Not applicable	Not applicable
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	Not applicable	Not applicable
Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Yes, it has been cross checked against end user agreement signed with the beneficiary by SEDS /5/	Yes, The data has been cross checked against daily log book records for monitoring of biogas units

		maintained by village level volunteers for operational and non operational days /4/.
How were the values in the monitoring report verified?	It has been verified with the SEDS database /3/	The data has been verified from the details in SEDS database /3//for monitoring of biogas units.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. QA/QC process defined in the PDD /15/ has been found to be implemented satisfactory /10/.	Yes. QA/QC process defined in the PDD /15/ has been found to be implemented satisfactory /10/.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not applicable	Not applicable

	Assessment/ Observation	Assessment/ Observation
Data / Parameter: (as in monitoring plan):	Confirmation that non-renewable biomass has been substituted (B_y)	Non-usage of biogas plants
Measuring frequency:	Annually by stratified sample survey	Continuous
Reporting frequency:	Annually	Daily basis and entered into monitoring data base
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	Yes.
Type of monitoring equipment:	There is no monitoring equipment to measure this parameter. This confirmation is made based on statistical sample surveys conducted in 2011 and 2012 /9/. The sample surveys include question to confirm whether biogas is sufficient for cooking.	There is no monitoring equipment to measure this parameter. Non-usage of biogas units are monitored on a daily basis for all biogas units by village level volunteers. The monitored non-operational days of all the installed units are used to calculate biogas units

		operational days in a year. During this monitoring period, the biogas systems were monitored on a day to day basis for non-operational days by the village level volunteers, which was entered into the SEDS database for all the biogas units /3/.
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan and/or methodology does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable	Not applicable as no monitoring equipment is used for monitoring of this parameter.
Calibration frequency /interval:	Not applicable	Not applicable
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	Not applicable	Not applicable
Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Cross checked during site verification of sample biogas units by DNV.	Yes, The data has been cross checked against daily log book records for monitoring of biogas units by village level volunteers for operational and non

		operational days /4/.
How were the values in the monitoring report verified?	The conclusion in the monitoring report were verified against the stratified annual sample survey data /9/.	The data has been verified from the SEDS database /3/ for monitoring of biogas units.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. QA/QC process defined in the PDD /15/ has been found to be implemented satisfactory. .	Yes. QA/QC process defined in the PDD /15/ has been found to be implemented satisfactory /9/.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not applicable	Not applicable

	Assessment/ Observation
Data / Parameter: (as in monitoring plan):	Diversion of non-renewable biomass saved under the project activity by non project households
Measuring frequency:	Annually by stratified sample survey in 2011 and 2012
Reporting frequency:	Annually
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Based on statistical sample survey of non-biogas user families in the project area conducted in 2011 and 2012, data entry and analysis /9/. The sample survey include question to confirm that after the project activity implementation there is: (i) No increase in fuel wood usage (ii) No replacing of crop residue with fuel wood (iii) No increase in cut and carry of fuel wood This confirms that there is no leakage related to diversion of non-renewable biomass saved under the project activity by non-project households/ users who previously used renewable energy sources.
Is accuracy of the monitoring equipment	Not applicable

as stated in the monitoring plan? If the monitoring plan and/or methodology does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	
Calibration frequency /interval:	Not applicable
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	Not applicable
Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Not applicable
How were the values in the monitoring report verified?	The conclusion in the monitoring report were verified against the stratified annual sample survey details /9/. However, a net to gross adjustment factor of 0.95 to account for leakages (based on the latest version of AMS-I.E methodology, Version 5) has been applied to be conservative in the calculations of emission reductions.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. QA/QC process defined in the PDD /15/ were found to be implemented satisfactory /9/.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	Not applicable.

3.7 Assessment of data and calculation of emission reductions

As per the PDD /15/, the emission reductions resulting from the project activity during the above mentioned period have been calculated as follows-

$ER_y = B_y * f_{NRB,y} * NCV_{Biomass} * EF_{projected\_fossilfuel}$

Where:

ER_y = Emission reductions during the year y in tCO_2e

B_y = Quantity of biomass that is substituted or displaced in tonnes

$f_{NRB,y}$ = Fraction of biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods.

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

$EF_{projected\_fossilfuel}$ = Emission factor for the projected fossil fuel consumption in the baseline. The fossil fuel likely to be used by similar consumers is taken: 71.5 tCO_2 /TJ for kerosene.

B_y is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year). As per the PDD based on survey at validation, the annual consumption of biomass per appliance i.e. per family is fixed *ex-ante* as 3.37 tonne/year /15/. Continued validity of this has been confirmed by Annual Surveys for the year 2011 and 2012 /9/ in line with the PDD and in accordance with the CDM-EB "Guidelines for sampling and surveys for CDM project activities and programme of activities" /23/.

During the monitoring period, the quantity of biomass that were substituted is arrived after deducting the monitored value of non-operational days (48 026) of all 2 403 bio gas digester and is calculated to be 6 590.22 tonnes /2/.

As per the PDD /15/, other parameters fixed ex-ante are:

- Fraction of non renewable biomass-(90%)
- Net calorific value of biomass- 0.015 TJ/tonne
- Emission factor of kerosene- 71.5 tCO_2/TJ

Hence assumptions, emission factors and default values that were applied in the calculations have been verified and found to be applied correctly.

Substituting the values, the emission reduction (ERy) in this monitoring period /2/ is:
ERy = 6 590.22 tonne * 0.9*0.015 TJ/tonne *71.5 tCO_2/TJ = 6 361.2 tCO2e, that is 6 361 tCO_2e.

Leakage

The project does not involve the substitution of non-renewable biomass with renewable biomass nor any equipment transferred from another activity as all units were built new specifically for the project, as verified from the monitoring data base /3/. Therefore leakage will not take place on this account.

Data on the amount of biomass saved under the project activity that is used by non-project households or users collected through a stratified sample survey conducted in the project area /9/ indicated that renewable biomass energy sources such as crop residue, fallen twigs and branches though low were still used as they are the easiest to collect compared to collection of fuel wood from forests which involves more time and effort as they are beyond the village and agricultural lands. All the respondents of the survey of non-biogas user families reported continued use of the same quantity of crop residue and fallen twigs and branches even after the project activity and no replacement of crop residues getting replaced by non-renewable fuel wood. Thus the quantity of non-renewable wood used by the non-biogas user families has remained the same and not increased due to the project activity

Use of non-renewable biomass saved under the project activity to justify the baseline of other CDM is also not a potential source of leakage as, there were no CDM project activities in the region (5 mandals of Anantapur district) under validation/registration as verified from UNFCCC and UNEP website /11/ and confirmed during site visit /28/. The other registered CDM biogas project in Anantapur district "Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh" (UNFCCC:3779) /12/, is not covering the 5 mandals covered by this project and is away from this project area. Thus there is no portion of non-renewable biomass saved under the project activity that is being used as a baseline of other CDM project activity to adjust.

Increase in the use of non-renewable biomass outside the project boundary to create non-renewable biomass baselines is also not a potential source of leakage, since there is no other CDM project activities in the region of SEDS as mentioned above

However, to be conservative, the project participant has multiplied B_y by a net to gross adjustment factor of 0.95 to account for leakages,(based on the latest version of AMS-I.E methodology.

Emission reductions (tCO_2) after accounting for leakage as above = 0.95*6361.2=6 043 tCO_2./2/..

The parameters reported, including source, frequency and review criteria as indicated in the monitoring plan were verified to be correct and in line with the monitoring plan of the revised PDD /15/.

As outlined above, the input data for calculating the emission reductions, the calculating process and the result are complete and transparent. The assumptions, emission factors and default values that were applied in the calculations have been justified and were correctly applied. DNV is able to confirm the accuracy of the emission reductions calculations have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology.

3.8 Quality of evidence to determine emission reductions

DNV assessed log book records for monitoring of biogas units maintained by village level volunteers for non-operational hours /4/, the database at SEDS head office in Anantapur for the biogas units /3/ and the end user agreements between SEDS and biogas unit users /5/. All the data are also available in hard copies and were evidenced during the verification process. As detailed in section 2 above, during the site visit DNV visited a sample of households for inspection of the biogas units installed and checked the records as per the random sample selected. DNV did not find any discrepancy in the data reported and so accepted the data submitted with respect to the number of biogas installation and non-operating days that have been used for emission reduction calculations /2/.

3.9 Management system and quality assurance

SEDS is responsible for the operation and maintenance of the project and data collection. SEDS has sufficiently established management procedures and has implemented them effectively to ensure that the process is consistent and the same has been verified to be in place by DNV during on site audit /10//28/. The procedures cover management responsibilities, data monitoring procedures, training procedures, management reviews and corrective actions in case of any deviations.

DNV confirms from the discussions that were held during the site visit /28/ that the responsibilities and authorities in the management and operational system for monitoring and reporting are in accordance with the responsibilities and authorities as detailed in the PDD and complies with the monitoring plan as per the PDD /15/.

4 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions that have been reported for the CDM project activity 3541"Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India for the period 1 January 2011 to 31 December 2012.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

It is DNV's responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. DNV does not express any opinion on the selected baseline scenario or on the validated and registered PDD.

DNV conducted the verification on the basis of the baseline and monitoring methodology AMS-I.E (version 01), the monitoring plan contained in the PDD (version 8 of 26 March 2013) and the monitoring report (version 2) dated 8 April 2013. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV's verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 1 January 2011 to 31 December 2012 are fairly stated in the monitoring report (version 2) dated 8 April 2013.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-I.E (version 01) and the monitoring plan contained in the PDD (version 8 of 26 March 2013).

DNV Climate Change Services AS is able to certify that the emission reductions from the CDM project activity 3541 "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" in India during the period 1 January 2011 to 31 December 2012 amount to 6 043 tonnes of CO_2 equivalent.

Bangalore and Oslo, 22 April 2013.

S.Ranganathan
Verifier
DNV Bangalore, India

Hendrik W. Brinks
Approver,
DNV Climate Change Services AS

5 REFERENCES

Documentation provided by the project participants

/1/ Social Education and Development Society (SEDS) : CDM monitoring report for project activity 3541 "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor" for the monitoring period 1 January 2011 to 31 December 2012, Version 01 dated 28 Januarys 2013 and version 2 dated 8 April 2013.

/2/ SEDS: ER calculation sheet "SEDS ER calculation –v2-xlx " for the monitoring period 1 January 2011 to 31 December 2012, initial version 01 dated 12 December 2012 and final version 2 dated 22 March 2013..

/3/ SEDS: Monitoring solution database at SEDS head office in Anantapur for complete 2403 biogas units monitoring details

/4/ SEDS: Biogas CDM project-Break down log book for monitoring of biogas units maintained by village level volunteers for details of individual biogas units regarding break down, operational and non operational hours

/5/ SEDS: End user agreements between SEDS and biogas unit users.

/6/ SEDS: Store register maintained which has details of biogas stove issued

/7/ CREST: Invoice for supply of biogas stoves and specification of biogas stove dated 8 December 2011(sample)

/8/ Chartered Accountant: Audit report of SEDS for the financial year ending 31 March 2012 dated 29 September 2012

/9/ (i) SEDS/FCN: Data and analysis of surveys of biogas users for usage of the non-renewable wood and kerosene, for 2011 and 2012 (spread sheet)
(ii) SEDS/FCN: Data and analysis of surveys of the non-biogas users for 2011 and 2012 (spread sheet)
(iii) SEDS/FCN: Filled questionnaire of field survey(sample).

/10/ SEDS: Standard Operating Procedure for SEDS CDM Biogas project
(ii) SEDS: Mason training of June 2011 and.Village level volunteer workshop dated 24 November 2012
(iii) CDM biogas meeting at Gorantla, dated 17 November 2012.

/11/ UNEP-Risoe: CDM pipeline - http://www.cdmpipeline.org/ (last updated 1 March 2013)

/12/ UNFCCC: Project 3779: Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh
(http://cdm.unfccc.int/Projects/DB/PJR%20CDM1276493114.29/view)

Other project documents or documents used by DNV to verify the information provided by the project participants

/13/ SEDS: CDM-PDD for project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor, version 6 of 18 March 2010

/14/ TUV NORD: Validation report for project activity 3541 "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor Report No.

53604108 – 08/377 rev 3. dated 22 March 2010

/15/ SEDS: Revised CDM-PDD for project activity "Social Education and Development Society (SEDS) Biogas CDM project for the rural poor, version 7 of 28 January 2013 and version 8 of 26 March 2013.

/16/ Det Norske Veritas AS (DNV): Validation Opinion for Post registration changes dated 17 April 2013.

/17/ William Godden: Sample size calculator formula for sample size http://williamgodden.com/samplesizeformula.pdf

Methodologies, tools and other guidance by the CDM Executive Board

/18/ CDM Executive Board: *Clean Development Mechanism Validation and Verification Standard,* version 03.0 dated 23 November 2012

/19/ CDM Executive Board: *Clean Development Mechanism Project Standard,* version 02.1 dated 3 December 2012.

/20/ CDM Executive Board: *Clean Development Mechanism Project Cycle Procedure,* version 03.1 dated 3 December 2012

/21/ CDM Executive Board: *Baseline and monitoring methodology AMS-I.*E, version 01

/22/ CDM Executive Board: *Standard for sampling and surveys for CDM project activities and programme of activities Ver03.0,* EB69 Annex 4

/23/ CDM Executive Board: *Guidelines for sampling and surveys for CDM project activities and programme of activities* EB69 Annex05

/24/ SSC working group *Clarification (F-CDM-SSCwg ver 01 SSC_543*) permitting to use *ex ante* for the fraction of non –renewable dated 6 July 2011

/25/ CDM Executive Board: *Baseline and monitoring methodology AMS-I.*E, *version 5*

/26/ CDM Executive Board: *Definition of renewable biomass, EB 23 Annex 18*

/27/ UNFCCC: Monitoring report publication http://cdm.unfccc.int/Issuance/MonitoringReports/mr_for_date.html?date=2013/02/08

Persons interviewed during the verification

/28/ Manil Jayasena Joshua, CEO,SEDS

/29/ G .Kasi Viswanath Rao,SEDS
A.KrishnaMoorthy,SEDS

/30/ Dr. Sudha Padmanabha ;FCN,

/31/ S.Venugopal ,village level volunteer
B.Radhadevi, village level volunteer
K.Gopal, village level volunteer
B.Narasimhan, village level volunteer.

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APPENDIX A

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	Referring to the Monitoring Report (MR) section D.3 on sampling plan, basis for P values (expected proportion) used for calculating sample sizes are to be confirmed and justified Apportioning the number of households to be sampled from each Mandals, given in Tables in page 19 of the MR, is as per CDM EB Guidelines on sampling and surveys need to be confirmed.	The P value used for calculating sample size is based on the percent of operational biogas units. The number of biogas units operational is more than 85%. But to get a good sample size, a conservative value of 85% has been considered. The explanation has been provided in the revised Monitoring Report. The apportioning of the number of households to be sampled is as per CDM EB guidelines and the equation to arrive at the number of households to be surveyed has been included in the revised MR_Version 2.	Section D.3 of the revised MR version 02 clarifies the value of "P" used for sample size calculation for parameter *confirmation that non-renewable biomass has been substituted* by biogas users, with justification for the same. The p value used is 0.85 which is conservative compared to the ratio of actual operating days to total biogas operating days (0.937) observed during this monitoring period. DNV consider the value of 0.85 as acceptable. Section D.3 of the revised MR version 02 gives the basis for apportioning of the number of households to be surveyed from each of the mandals covered by the project activity. As the proportions of units from the different mandals in the sample are the same as the proportions in the population, DNV consider this to be in conformance with CDM EB Guidelines on sampling and surveys /23/. CAR-1 is closed

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 2	The revised PDD submitted indicating the change in project design is not referring to the latest version of Project Standard. (Refer section A.4.1 of the PDD). Also, the revised PDD is not clear on (i) how additionally of the project is ensured when selecting house holds in new villages.	The latest version of the project standard, i.e. Version 2.1 has been referred to in section A.4.1 of the revised version 8 of the PDD dated 26th March 2013. The additionality of the project is being ensured by selecting the households in the rural region. Also the baseline information of the household is collected and included in the monitoring solution, wherein, the household is cooking using traditional cook with fuel wood in the baseline	SectionA.4.1 3 of the revised PDD version 08 use the latest version 02.1 of the Project Standard dated 3 December 2012 As per the revised PDD, section 4.1, the project activity will be implemented only in households in rural regions in the project boundary of 5 mandals of Anantapur district. As per the registered PDD additionality of the project activity has been deliberated considering the target population of the project as rural poor households of Anantapur district and argued on the basis of investment, technological, prevailing practice and other barriers. As the addition of the families in rural villages in the same 5 mandals as in the registered PDD are proposed for inclusion as part of the design change. DNV concludes that there is no impact on the additionality. CAR-2 is closed

Clarification requests

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	The reasons for delay in the phased implementation of the project activity and the expected implementation dates are not clear from the MR and the revised PDD submitted (Refer VVS version 3.0, paragraph 228). Project participant is requested to clarify these.	The reason for delay in the implementation of the project activity is described in the revised monitoring report and the revised PDD. By end of 31 Dec 2012, 2403 units have been commissioned and 786 are under construction. The PP intends to complete the construction of remaining biogas units before end of December 2014. This explanation is included in the revised MR and the PDD.	Section B.1 of the revised MR version 02 discusses the reasons for delay in implementation and expected date of completion of implementation. CL-1 is closed.

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL-2	The following are not clear in the revised PDD submitted: • number of villages proposed for implementation • when the proposed changes occurred, and whether the changes would have been known prior to registration of the project activity, • and how the changes would impact the overall operation/ability of the project activity to deliver emission reductions as stated in the PDD; Project participant need to clarify these.	The following has been included in the revised PDD: • The number of villages proposed for implementation is about 250. • The changes were not known prior to the registration of the project activity. The changes occurred after the start of the implementation. The villages were more than that proposed and the households were also different from that initially surveyed. Of course the proposed households are from the rural regions in the project boundary i.e. the 5 Mandals of Anantapur. • The changes does not impact the overall operation/ability of the project activity to deliver emission reductions due the following: • The project boundary is the same as that described in the PDD. • The end users are rural households using fuel wood and traditional cook stove for cooking in the baseline. The baseline data of all the households for which biogas is being implemented are collected and entered into the digitized monitoring database, which clearly shows that the rural households are using fuelwood on traditional cookstove for cooking.	The project participants faced problems during implementation, which was after CDM registration /28//30/. . The baseline information of the rural household will be collected and maintained by the project participant to ensure that only houses cooking on traditional cook stove using fuel wood are selected for construction of biogas units in the project area so that the baseline remains valid. As per the revised PDD, the number of biogas units for installation under the project will remain the same at 5,000 units of 2 m^3 capacity. Thus the change will not impact the ability of the project activity to deliver emission reductions as stated in the registered PDD. CL-2 is closed.

Forward action requests from previous verification/validation

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
	No FAR from validation and this is the first verification of the project activity.		

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants
	No FAR raised during this verification	

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APPENDIX B

POST REGISTRATION CHANGES

Type of post registration change	**Description of post registration change***	**Is prior approval by CDM EB required**?**	**In case prior approval by CDM EB is required, when was post registration change approved?**
Changes to the project design of a registered project activity	As per the registered PDD dated 18 March 2010, 5 000 biogas units are to be implemented as part of the project activity in 121 villages in 5 mandals of Anantapur district. The beneficiaries that showed interest and were identified upfront for the project activity during the survey in 2008 were in 121 villages in 5 mandals of Anantapur. During the course of implementation project participant could not construct the biogas units for many of the identified beneficiaries due to: (a) migrations of families to neighbouring villages, (b) unsuitable site conditions such as rocky or sandy, which prevents excavation of land to construct the biogas dome, etc. Project proponent is proposing to identify and provide with biogas units to interested end users from other villages from within the project boundary of the 5 mandals in Anantapur District. The project will still be implemented in the villages of 5 mandals of Anantapur, which is in the project boundary, but will be in more than 121 identified villages. The number of villages proposed for implementation is 250. The change in terms of additions of rural households from more than 121 villages of the 5 mandals of Anantapur district does not impact the overall operation/ability of the project activity to deliver emission reductions as : • The project boundary remains the same as that described in the PDD. Addition of households will be from villages of the same 5 mandalas of Anatapur district, namely, Penukonda, Roddam, Somandepalle, Gorantla and Chilamathur. • The end users are rural households using fuel wood and traditional cook stove for cooking in the baseline. • The baseline information of the rural household will be collected and maintained by the project participant to ensure that only houses cooking on traditional cook stove using fuel wood are selected for construction of biogas units in the project area.	☐ Yes ☒ No ☐ Not applicable	*Not applicable*

Type of post registration change	Description of post registration change*	Is prior approval by CDM EB required**?	In case prior approval by CDM EB is required, when was post registration change approved?
	As per the registered PDD additionality of the project activity, has been deliberated considering the target population of this project as rural poor households of Anantapur district and argued on the basis of investment, technological, prevailing practice and other barriers. The same circumstances will still be valid for the families in rural areas proposed for inclusion as part of the design change. DNV concludes that there would be no impact on the additionality. As per the revised PDD, the number of biogas units for installation under the project will remain the same at 5 000 units of 2 m3 capacity. In summary it's DNV opinion that the design change involving implementation of biogas stoves in house holds of more than 121 villages of the 5 mandals of Anatapur distrct proposed in the revised PDD, version 08, dated 26 March 2013 do not impact the project size and design, additionality, applicability of methodology or scale of the project activity DNV recommends the approval of the changes to the project design submitted by the project participant.		

* For further details refer to the "Post-registration changes request form" (F-CDM-PRC) and DNV's assessment opinion on the changes/16/

** Refer to Appendix 1 Appendix 1 to the CDM Project Standard /19/.

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APPENDIX C

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Krishnan Namboodiri. Holds graduate degree in chemical engineering and has done a short term diploma course in Management. Prior to joining DNV in 2008, has had 24 years of direct work experience in the fertilizer and chemicals industry. Work experience covers 5 years in process design & engineering for chemical industry; 7 years in technical services including environment management activities, 7 years in project management and 5 years in training & corporate planning in fertilizer & petrochemical manufacturing units. Has been actively involved in Management System Audits as per ISO 14001 for more than 8 years.

The above work experience includes-(a) experience in steam system optimization & trouble shooting , development of improvement schemes in large fertilizer & caprolactam complex (b) Design and engineering, efficiency studies and development of efficiency improvement schemes for fossil fuel fired steam & power generation plants (c) Implementation of energy saving measures in Ammonia plants , sulfuric acid plant etc (d)Monitoring, trouble shooting and development & implementation of of improvement schemes for of pollution control facilities (chemical, aerobic & anaerobic treatment systems) in Fertilizer and petrochemical complex. Development & implementation of landfill facilities for solid and hazardous wastes from fertilizer & caprolactam manufacturing complex.

He has received extensive training in the CDM validation and verification process. He is an appointed GHG auditor for the CDM validation and verification program of DNV and has performed validation & verification of several CDM projects and other 3rd party validation/verification services.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in (1) Thermal energy generation from fossil fuels as well as thermal electricity from solar (2) waste handling and disposal (3) Energy demand (4)Household end use energy efficiency (5) Chemical process industries and (6) Energy generation from renewable energy sources.

Seshan Ranganathan, holds a Bachelor's Degree in Chemical Engineering and has done diploma course in Management and completed the graduate ship course in Industrial Engineering and has an overall working experience of around twenty nine years. Prior to joining DNV has around twenty four years' experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat recovery, efficiency studies of boilers ,power plants , safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry . With respect to the thermal power plant the job assignment included the monitoring of flue gas exit temperatures, excess air used efficiency of fuel additives, condition of boiler refractory, insulation of steam lines etc. The experience also includes 5 years in process design & engineering for chemical process industry.

He is qualified validator and verifier for CDM projects and is carrying out the same for the past five years. He has completed the EMS lead auditor course. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass including thermal electricity from solar (b) 1.2 Energy generation from renewable energy sources (c) 2.2 Heat distribution (d) 5.1/11.1/12.1 Chemical Processes Industries and (e) 13.1 Waste handling and disposal.

Shilpa Swarnim holds a Master's degree in Science with major in Biotechnology. She has been previously associated with Indian Institute of Science, Bangalore as Research Assistant. She has also worked as Lecturer in Bangalore University affiliated college and her subjects of interest were Environmental Science and Climate change.

With total experience of approx. 7 years into Research and Academics her topic of research centers around issues related to Forestry, Environment, Climate change impact on forest ecosystems, studying the climate impact modeling for future predictions of climatic and vegetation dynamics.

She has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA along with DNV Training Programme on Corporate GHG Inventory.

Currently working in DNV AS, Bangalore unit, as Project manager, she is involved in the Validation and Verification of CDM projects pertaining to various sectors.

Indrajit Rana holds double Bachelor Degree, in Chemical engineering and in Chemistry and is a certified energy auditor from Bureau of Energy Efficiency (BEE) of Government of India. Having an overall experience of more than ten years. Prior to joining DNV having around six years' experience in Chemical process industry namely Petrochemical industry covering production, day to day production planning, energy efficiency improvement, safety, and capacity expansion of existing unit. His experience also covers the fields of environmental management and resource conservation including optimisation of steam consumption. Being shift in charge of HDPE unit he has acquired the knowledge of utility services like, nitrogen, hydrogen, plant air and water, steam, power and flare system. He is adequately experienced in handling many types of energy intensive rotating equipment like brine refrigerator (screw compressor), centrifugal and reciprocating compressor, blower, vertical mounted centrifugal pump, extruder, etc. and also experienced in handling DCS and advanced process control systems. He has knowledge in material balance and energy balance of HDPE plant. He has also experience in integrated offsite plant (IOP) mainly waste water treatment plant, cooling tower operation and flare operation.

He has experience of around 4 years in validation and verification of numerous CDM projects in DNV, both in India & abroad.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in TA 1.1, TA 1.2, TA 3.1, TA 3.2 and TA5.1, TA 11.1, TA12.1

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