



ASSESSMENT OPINION

REGARDING POST REGISTRATION CHANGES

SKG SANGHA

KOLAR BIOGAS PROJECT

Report No: 8000429974 – 14/009

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Project:	Title:	Registr. date:	UNFCCC-No.:	
	Kolar Biogas Project	24/11/2011	4058	
Project Participant(s):	Host Country PP – Name:		Host Party:	
	SKG Sangha		India	
	Investor PP(s) – Name(s):		Investor Party(ies)	
	Foundation myclimate – The Climate Protection Partnership		Switzerland	
Applied methodology/ies:	Title:	No.:	Scope:	
	<i>“Thermal energy for the user with or without electricity”</i> <i>“Switch from Non-Renewable Biomass for Thermal Applications by the User”</i> <i>“Methane recovery in agricultural activities at household/small farm level”</i>	AMS.I.C –ver. 18 AMS.I.E –ver.3 AMS.III.R – ver.1	1 and 15 / TA 1.1, 1.2 and 13.2 ¹	
Post Registration Changes:	Type of requested changes		Number of changes	Prior Approval required
	<input checked="" type="checkbox"/> Temporary deviations from the MP		1	<input checked="" type="checkbox"/>
	<input type="checkbox"/> Temporary deviations from the MM		-	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Corrections that do not affect the project		several	<input type="checkbox"/>
	<input type="checkbox"/> Change to the start date of the crediting p.		-	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Permanent changes from the MP		3	<input checked="" type="checkbox"/>
	<input type="checkbox"/> Permanent changes from the MM		-	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Design changes to the project activity/PoA		2	<input checked="" type="checkbox"/>
	<input type="checkbox"/> Changes specific to A/R		-	<input type="checkbox"/>
Revised PDD:	Title:	Version:	Attached in TC:	Attached clean:
	Kolar Biogas Project	14	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Assessment team / Technical Review and Final Approval	Assessment Team:		Technical review:	Final approval:
	Stefan Winter Indrapal Parmar (TM) (TL/TE) Mohinder Amarnath (TM)		Rainer Winter	Rainer Winter
Assessment Opinion:	<input checked="" type="checkbox"/>	The post registration changes require prior Approval by the Board		
	<input type="checkbox"/>	The post registration changes do not require prior Approval by the Board		
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¹ As per methodology the scope is indicated as 15 however as per transitional provisions technical area is changed from 15.2 to 13.2. see also accreditation standard version 6.

Abbreviations

CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO₂	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
DNA	Designated National Authority
EB	CDM Executive Board
GHG	Greenhouse gas(es)
GS	Gold Standard
HH	Household
PA	Project activity
PDD	Project Design Document
PoA	Programme of Activities
PRC	Post Registration Changes
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

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1 OBJECTIVE / SCOPE

SKG Sangha has commissioned the TÜV NORD JI/CDM Certification Program (CP) to assess post registration changes of the project

“Kolar Biogas Project”

This report serves for all kind of post registration changes as defined in the PS.

This report serves as an annex to the Post-registration changes request form (CDM-PRC-FORM).

2 GENERAL CHARACTERISTICS

2.1 Project Characteristics

Essential data of the project is presented in the following Table 2-1.

Table 2-1: Project Characteristics

Item	Data
Project title	Kolar Biogas Project
Project type	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> PoA
Project size	<input type="checkbox"/> Large Scale <input checked="" type="checkbox"/> Small Scale
Project Scope (according to UNFCCC sectoral scope numbers for CDM)	<input checked="" type="checkbox"/> 1 Energy Industries (renewable- /non-renewable sources)
	<input type="checkbox"/> 2 Energy distribution
	<input type="checkbox"/> 3 Energy demand
	<input type="checkbox"/> 4 Manufacturing industries
	<input type="checkbox"/> 5 Chemical industry
	<input type="checkbox"/> 6 Construction
	<input type="checkbox"/> 7 Transport
	<input type="checkbox"/> 8 Mining/Mineral production
	<input type="checkbox"/> 9 Metal production
	<input type="checkbox"/> 10 Fugitive emissions from fuels (solid, oil and gas)
	<input type="checkbox"/> 11 Fugitive emissions from production and consumption of halocarbons and hexafluoride
	<input type="checkbox"/> 12 Solvents use
	<input checked="" type="checkbox"/> 13 Waste handling and disposal ²
	<input type="checkbox"/> 14 Afforestation and Reforestation
	<input type="checkbox"/> 15 Agriculture
	<input type="checkbox"/> 16 Carbon capture and storage
Applied Methodology	AMS-I.C "Thermal energy for the user with or without electricity" ver. 18; AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User" ver.3; AMS-III.R "Methane recovery in agricultural activities at household/small farm level" ver. 1
Technical Area(s)	1.1: Thermal Energy Generation 1.2: Renewables 13.2 Manure
CDM registration No.	4058
Crediting period	<input type="checkbox"/> Renewable Crediting Period (7 y) <input checked="" type="checkbox"/> Fixed Crediting Period (10 y)

The proposed project activity is a community based project activity which will provide biogas units to households in rural areas of Kolar District in Karnataka State in India. The project now targets to cover 9,380 households in five Taluks in Kolar District Karnataka State in India namely Srinivasapur, Kolar, Mulbagal, Malur and Bangarapet. The biogas unit will be of either 2 m³ or 3 m³ capacity depending on the number and

² According to Accreditation Standard 6 and transitional provisions TA15.2 Animal waste management has been transferred to TA13.2 Manure. Therefore scope 13 is ticked even though the methodology still refers to scope 15.

type of cattle owned by the household and the number of people in the household. At least two cattle will be required for a household to be eligible for a 2m³ biogas unit and at least 3 cattle will be required for a household to be eligible for a 3m³ biogas unit. As per updated implementation schedule, 2,814 units of 3 m³ capacity and 6,566 units of 2 m³ capacity will be installed under this project activity. Currently until the end of this monitoring period 4069 biogas digesters are installed. SKG Sangha, an Indian non-governmental organisation (NGO), will implement this project activity. The project activity will reduce the amount of fuel wood and kerosene used for cooking and heating water and will replace inefficient traditional cooking stoves with cleaner biogas stoves. The project activity will also reduce methane emissions from cattle manure and will contribute to the sustainable development of the rural households involved in this project activity.

Technical data of the project activity:

As per registered project design document (PDD) of the project in each household, a family-size biodigester together with a biogas-based cooking stove unit are installed. The biogas units are constructed of bricks, sand, cement, pipes, pipe fittings, metal clips, wire and gas burners. Each bioreactor will be a mesophylic fixed dome. The capacity of the biodigesters will be either 2m³ or 3m³ of biogas per day. The biogas unit size for a particular household will be chosen based on the number and type of cattle owned by the household and the number of people in the household. SKG Sangha will build the systems with the help of people from the households. Cattle dung and wastewater will be fed into the biodigester daily. Cattle dung and kitchen wastewater will be added to a mixing tank above ground which has an inlet pipe to a digester chamber which is below ground. The dung and wastewater slurry remains in the chamber for approximately 40 days and breaks down anaerobically producing biogas. This biogas builds up above the slurry and remains in the chamber until it is released through the gas outlet pipe at the top of the dome when the gas burner in the household is turned on (the pipe at the top of the biodigester leads to the cooking stove in the household). The biodigester also produces slurry which is pushed into the outlet tank and displacement chamber as the biogas builds up in the digester and finally exits through the slurry discharge hole. The technology has been tested and is widely used in India.

For a detailed project description please refer also to the registered PDD.

2.2 Overview of Post Registration Changes

Within this report post registration changes as listed in Table 2-2 are assessed.

Table 2-2: Overview Post Registration Changes

#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
1	01/04/2012 – 31/12/2013	TDfrMP	Deviant approach due to the reason that the monitoring survey has not been conducted in accordance with registered monitoring plan.
2	-	TDfMM	-

#	Applicable as of / from - to	Type of post registration change ¹⁾	Description
3	01/04/2012	CrPDD	During revision of the PDD for this PRC the PDD has also been updated w.r.t. several editorial changes.
4	-	ChSD	-
5	01/04/2012	PCfrMP	<ol style="list-style-type: none"> 1. The ex-ante fixed value for parameter GWP_ CH4 has been changed from 21 to 25 for ER calc in the second commitment period and is now in line with the IPCC value given. 2. PDD has been updated to clearly distinguish between baseline and project related values of certain parameters e.g. $B_{\text{biomass,baseline}}$ and $B_{\text{biomass,project}}$. 3. EF_{kerosene}: Specification is made in B.6.2 under "additional comment" due to now included calculation of project emissions as per AMS-I.C applying value 73,700 kgCO₂/TJ kerosene.
6	-	PCfMM	-
7	01/04/2012	CoPD	<ol style="list-style-type: none"> 1. The biogas implementation plan has been adapted to the current status. Number of units installed per year has been corrected down. Number of Total units installed under the project activity has been corrected down from 10,000 units to 9,380 units. 2. The PDD is updated as it did not provide any reference to project emissions as per AMS-I.C methodology.
8	-	CstAR	-

- ¹⁾
- TDfrMP : Temporary deviation from registered monitoring plan
 - TDfMM : Temporary deviation from the monitoring methodology
 - CrPDD : Corrections to the registered PDD
 - ChSD : Change to the start date of the crediting period
 - PCfrMP : Permanent changes from registered Monitoring Plan
 - PCfMM : Permanent changes from Monitoring Methodology
 - CoPD : Changes to the project design of a registered project activity / PoA
 - CstAR : Changes specific to afforestation or reforestation

2.3 Assessment team members and technical reviewers

On the basis of a competence analysis and individual availabilities a assessment team, consistent of one team leader and 2 additional team members, were appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 2-3 below.

Table 2-3: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Stefan Winter	TN CERT	TL	SA	<input checked="" type="checkbox"/>	1.1, 1.2, 13.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Mohinder Amarnath	TN India	TM	LA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Indrapal Parmar	TN India	TM	A	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Walter Ulrich		TR	LA	<input type="checkbox"/>	13.2	<input type="checkbox"/>	<input type="checkbox"/>	-
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Rainer Winter		TR/FA	SA	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE

B) No team member

2.4 Assessment Steps

The *assessment of post registration changes* consisted of the following steps:

- Appointment of team members and technical reviewers
- A desk review of the registered and revised PDD^{/PDD/} submitted by the client and additional supporting documents
- On-Site assessment (if required)
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Resolution of corrective actions (CARs / CLs) (if any)
- Final reporting
- Technical review

- Final approval.

In this case all activities were carried out as part of the 1st verification of this project activity.

2.5 Review of Documents

The registered as well as the revised PDD and supporting background documents related to the project design and the post registration changes were reviewed.

As far as required the assessment team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

2.6 Follow-up Interviews

The validation team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for CDM.

During validation the validation team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in table 2-4.

Table 2-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives Project consultant	<ul style="list-style-type: none">- Details of the project validation and earlier verifications- Project history- Technical details of plant- Intended / implemented changes from the previous project design- Impact of changes on the additionality justification- Impact on the monitoring of the project- Editorial issues of the revised PDD

A comprehensive list of all interviewed persons is part of section 7 'References'.

2.7 Resolution of Clarification and Corrective Action Requests

2.7.1 Definition

A **Corrective Action Request (CAR)** will be established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for validation of the intended / implemented changes,
- there is a risk that the changes cannot be approved by the UNFCCC or that emission reductions would not be able to be verified and certified after the implementation of the changes.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

2.7.2 Assessment

After reviewing all relevant documents and taken all other relevant information into account, the assessment team issues all findings (in the course of a draft report, if applicable) and hands over the findings to the project proponent in order to respond on the issues raised and to revise the documentation accordingly.

The final reporting step starts after resolution of the raised CARs and CLs. In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive assessment opinion can be issued by the validation team.

The CAR(s) / CL(s) / FAR(s) are documented in the context of the respective chapters.

2.8 Technical review

Before submission of the final assessment report a technical review is carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. The technical reviewer is not considered to be part of the verification team and thus not involved in the decision making process up to the technical review.

As a result of the technical review process the assessment opinion as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

2.9 Final approval

After successful technical review of the final report an overall (esp. procedural) assessment of the requested post registration changes will be carried out by a senior assessor located in the accredited premises of TÜV NORD.

Only after this step the notification or the report can be forwarded to the UNFCCC (in case of a positive validation opinion).

3 CHANGES THAT DO NOT AFFECT THE PROJECT DESIGN

3.1 Assessment of Changes

Requested Deviation / Change #1			
Type of change(s):	<input checked="" type="checkbox"/>	<i>Temporary Deviation from Monitoring Plan</i>	
	<input type="checkbox"/>	<i>Temporary Deviation from Monitoring Methodology</i>	
	<input type="checkbox"/>	<i>Corrections that do not affect the project design</i>	
	<input type="checkbox"/>	<i>Permanent Change from Monitoring Plan</i>	
	<input type="checkbox"/>	<i>Permanent Change from Monitoring Methodology</i>	
	<input type="checkbox"/>	<i>Changes specific to afforestation or reforestation</i>	
A. Description of post registration change			
Start Date: Please provide the start date of the change	01/04/2012	End Date: Please provide the end date of the change, if applicable	31/03/2013

Requested Deviation / Change #1

Description:

Please give a detailed description of the change(s)

Deviant approach due to the reason that the monitoring survey has not been conducted at the time intervals as indicated in the registered monitoring plan.

However the following approach has been applied. Approval of this deviant monitoring survey, as conducted during first monitoring period, is requested by PP.

1. A temporary deviation from registered monitoring plan has been applied during this monitoring period. In the registered PDD it is stated that the monitoring survey for all parameters will be conducted every year. The monitoring of the two parameters "units in operation" and "hours of operation" are continuously monitored and have been monitored since 2012 on a daily basis. But the Monitoring survey for monitoring the other parameters was not conducted until 1 year and 9 month after the project activity start. Due to this a temporary deviation from the registered monitoring plan as per PDD is requested.

2. The reason for this temporary deviation from registered monitoring plan is the fact that the project activity achieved Gold Standard (GS) registration only in January 2014. The PP did not want to conduct the monitoring before successful GS registration, because only after registration the PP could be sure that the monitoring plan was approved. There were many sustainability parameters to be monitored from GS side apart from the parameters required to be monitored based on CDM requirements. For example the GS is insisting on 95% precision of data and hence the baseline values will be changed thus will affect the ER calculations. This approach is more conservative and felt more accurate too. The consequence is that the first monitoring survey was conducted only 1 year and 9 month after the start of crediting period and thus deviates from the registered monitoring plan.

The deviation is relating to the date of monitoring survey: The first monitoring survey was conducted 1 year and 9 month after start of crediting period instead after 1 year.

The deviation is applicable for the duration of the first year of project activity which is the period from 01/04/2012 – 31/03/2013. In that year, 3,145 units have been installed and continuously monitored but no comprehensive monitoring survey was conducted. From 01/04/2013 onwards, a monitoring survey was conducted and will be conducted on yearly basis which is in line with the registered monitoring plan.

B. Assessment of post registration change – Temporary deviations from MP or MM

Requested Deviation / Change #1

Accuracy:

Please give a detailed assessment whether the deviation is likely to lead to a reduction in the accuracy of the ER calculation.

The method of ER calculation is the same. The same equations are used for the calculation of final emission reductions achieved during the first monitoring period. However some values depend on the result of a conducted survey. This survey has been conducted at a later stage as indicated in the registered monitoring period. As per checked data and provided ER spreadsheet the later in time the higher is the number of installed and operating biogas systems.

The related parameters are:

- **H_{stove}** (hours) - Annual hours of operation of an average system (hours of burner functioning)
- **F_{kerosene,project}** (Litres) – Amount of kerosene consumed by household after installation of biogas unit
- **B_{biomass,project}** (Tonnes)– Consumption of fuel wood in households participating in project activity
- **B_{biomass, non-project}** (Tonnes) – Consumption of fuel wood in households not participating in project activity
- **N_t** (dimensionless) – annual average animal population in a household (number of heads of dairy, cow, buffalo and other cattle)
- **B_{manure_generated}** (Tonnes) – Average amount of animal manure generated per household per year
- **B_{manure,fed}** (Tonnes) – Average amount of animal manure fed into a biogas digester per year
- **Application of sludge** (qualitative information) – Proper application of the sludge from the biogas unit .

As per registered PDD and monitoring plan a minimum of 169 project-HHs have to be included in the survey and 58 non-project HHs. During the conducted survey 367 project households and 150 non-project households have been visited and interviewed. This is higher than the required number as required during validation based on the requirements by the standard for sampling and survey. Based on that the required number of HHs have been covered by the conducted survey even considering that the part of the survey is conducted in Year 3 outside this monitoring period. Considering the HHs covered in survey conducted in Year 2 264 project and 150 non-project HHs have been included. From this it can be stated that the required number of HHs in survey in Year 2 has been covered. Checking a higher number of units/households is therefore considered to provide a more accurate result. For the effect on the emission reduction calculation please refer to next point "Conservativeness".

As per PDD the PP proposed to include 100 non-project HHs and 30% of average operating units in Year 1 and from Year 2 onwards 5% of average operating units in the survey. With years the number of average operating units is considered to increase until all units are operating so the number of units covered by the survey. According to the PDD and at that time considered deployment plan in Year 1 30% would have been 250 project-households and 100 non-project HH which should be monitored/part of the survey. DOE has checked the list of households in ER spreadsheet and found that for first monitoring plan at the end of Year 1 on 31/03/2013, 3,145 units have been installed and in average 1,750 units were operating. This would lead to 525 (1,750x0.3) units. At the end of the monitoring period on 31/12/2013 4,069 units have been installed and in average 2,352 units were operating (see also Diagram 1 below). The end of the first monitoring period is in Year 2 for which the PP proposed to include 5% of average units. This would be 118 (2,352x0.05). For Year 2 also the proposed value has been reached.

Requested Deviation / Change #1

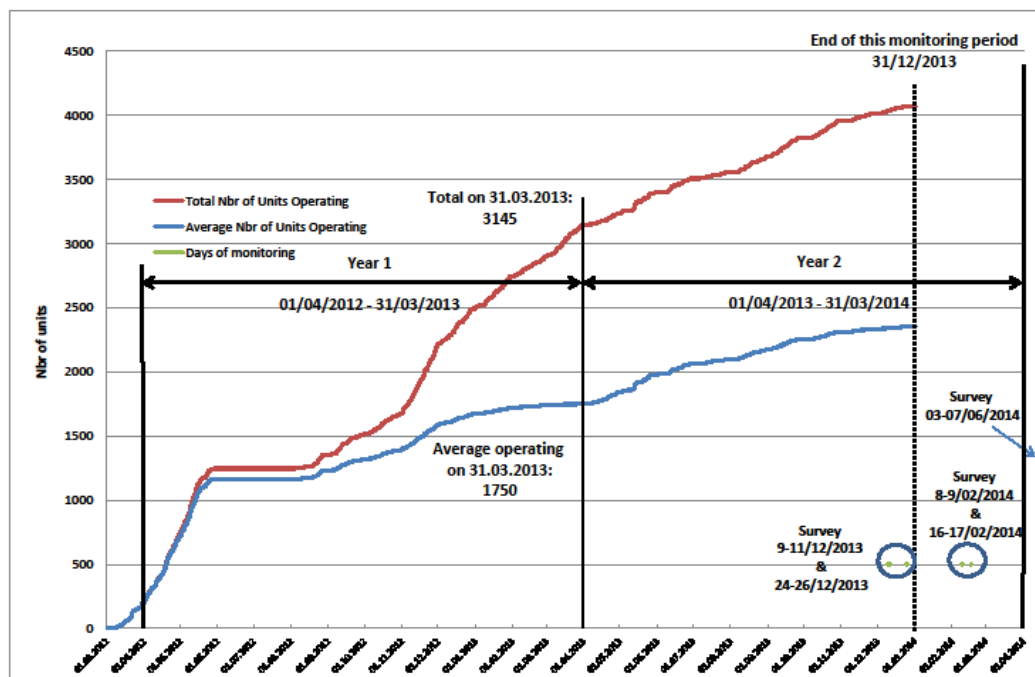


Diagram 1: Unit installation, average units operating and survey dates over project Year 1 and 2.

Requested Deviation / Change #1

Conservative-ness:

Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.

This is a biogas project. Values of number and type of cattle will affect the ERs. Monitored values were lower than the baseline values. Thus it will be conservative to apply these values for 2012.

The other values that will affect the ERs are the consumption of fire wood and kerosene for cooking needs. When the biogas plant functions well then the generated biogas will replace the fire wood and kerosene.

Chances of biogas plant functionality will come down with longer installed time. If the monitoring survey has been conducted in the middle of the 2012 all the plants will be new and function well. If the same plants were monitored after a long time the functionality rate may be lower. This is also a conservative approach.

The same applies for the survey of non-project households. The longer the project activity is running the bigger is the positive impact on the availability of wood fuel in the project region and the probability of leakage due to use of more biomass in non-project households increases over the years. Thus it is conservative to use the survey of 2014 for 2012 and 2013.

The same applies for use of kerosene in non-project households: The longer the project activity is running the bigger is the impact on kerosene availability in the project region. If there is less demand for kerosene, the price will drop, and thus the incentive for non-project HH to consume more kerosene than before.

The following table shows the comparative values of the baseline and the corresponding monitored values during this monitoring period to prove the conservativeness:

Sl. No.	Parameter	Unit	Baseline survey	Monitoring survey
1	H _{stove}	h/d	n.a. at time of validation ³	2.92
2	F _{kerosene,project}	l	24.12	0
3	B _{biomass,project}	kg/a	4,741	4.456 (0.09% of baseline value)
4	B _{biomass, non-project}	t/a	21.5	15.4
5	N _(i) number of animals Dairy cow Buffalo Other cattle	head	2.56 1.17 0.55	2.37 0.33 0.47
6	B _{manure, generated}	t/a	25.76	18.81
7	B _{manure, fed}	t/a	n.a. at time of validation ³	17.46
8	Application of sludge	-	Proper application of residue from digester	

The value of number of cattle, their generation of dung and amount of biomass use for cooking will affect the number of ERs. From the above table it is clear that the monitored values are lower than the baseline.

Thus from this point of view the applied values from the survey are more conservative than those applied for ex-ante emission reductions calculation.

³ Not included in baseline survey as the parameter corresponds to the project scenario.

Requested Deviation / Change #1

Besides to check the results of the survey the reliability of the survey conducted has been calculated in line with the Standard "Sampling and surveys for CDM project activities and programme of activities" and related Guideline EB75 Annex 8 esp. Appendix 4.

As the survey has been conducted on mainly three dates Dec 2013, Feb 2014 and June 2014, the analysis was done for two survey results. One the data collected during Dec 2013 and Feb 2014 has been used to check reliability and for total set of survey data. This is done due to the reason that the data collection in June 2014 is in project year 3 which is outside the first (this related) monitoring period.

The results of the reliability are as following:

For total set of data incl. 367 HH

Parameter	Mean	f	SD	Standard error of the mean	t-value	precision	Relative precision
H _{stove}	3.01	0.09019	0.9889	0.04942	1.6490	0.081	2.7%
F _{kerosene, project}	0		0	No result		-	-
B _{biomass, project}	0.07		0.5464	0.02720		0.044	65.9%
N _t - Buffalo	2.55		1.8179	0.09050		0.149	5.8%
N _t - Cow	0.49		1.4914	0.07426		0.122	25.2%
N _t - other cattle	0.66		1.8593	0.09257		0.152	23.0%
B _{manure, generated}	54.23		26.2931	1.30913		2.158	4.0%
B _{manure, fed}	5.54	0.03686	17.9097	0.89172	1.6551	1.470	26.5%
B _{biomass, non-project}	15.30		6.4835	0.51953	1.6551	0.859	5.6%
Application of sludge	0.83	0.09019	0.3722	0.02372	1.6449	0.039	5.9%

For data Dec 2013 and Feb 2014 incl. 264 HH

Parameter	Mean	f	SD	Standard error of the mean	t-value	precision	Relative precision
H _{stove}	2.79	0.06488	1.0161	0.06047	1.6506	0.0998	3.6%
F _{kerosene, project}	0		0	No result		-	-
B _{biomass, project}	0.09		0.6426	0.03825		0.0631	66.7%
N _t - Buffalo	2.41		1.8899	0.11248		0.3863	1.9%
N _t - Cow	0.45		1.2684	0.05091		0.0840	18.5%
N _t - other cattle	0.62		1.7336	0.10318		0.1703	27.5%
B _{manure, generated}	50.55		25.0005	1.48792		2.4560	4.9%
B _{manure, fed}	5.598	0.03686	19.5277	1.16220	1.6551	1.9184	32.1%
B _{biomass, non-project}	15.30		6.4835	0.51953	1.6551	0.8598	5.6%
Application of sludge	0.80	0.64880	0.4013	0.02924	1.6449	0.0481	8.4%

From the reliability result it can be concluded that some of the results do not meet the required precision.

W.r.t. the number of animal buffalo, cattle and other in case the total number of animal in a HH is considered the reliability is 5.9% (367)/6.5% (264) and therefore would be within the required precision of 10%.

Parameter	Mean	f	SD	Standard error of the mean	t-value	precision	Relative precision
N _t (367)	3.70	0.09019	2.657	0.132298	1.649	0.2181	5.9%
N _t (264)	3.49	0.06488	2.296	0.136674	1.650	0.2256	6.5%



⁴ Same values for 367 and 264 calculation have been stated as for the non-project survey no information is available to the DOE when each of the HH has been visited. Therefore no differentiation is possible.

Requested Deviation / Change #1

However as the precision is for several parameters not met the influence on ER calculation is determined as following:

Parameter	Relative precision	Related methodology	Used as to which equation	Influence on final ER result	Remark
H _{stove}	3.6%	AMS-III.R	Precision met no further action required		
F _{kerosene, project}	-	AMS-I.C.	BE _{kerosene}	Direct	No impact as value is for all values zero
B _{biomass,project}	66.7%	AMS-I.E	BE _{NRB}	Direct	Difference from baseline survey value to monitoring survey is applied. Is neglected as result from survey is 0.09% of baseline value.
N _t - Buffalo	1.9%	AMS-III.R	BE _{manure}	Direct	Precision met no further action required
N _t - Cow	18.5%	AMS-III.R			Lower bound value to be applied
N _t - other cattle	27.5%	AMS-III.R			
B _{manure, generated}	4.9%	none	Precision met no further action required		
B _{manure,fed}	32.1%	None	none	none	No influence in accuracy and conservativeness of ER
B _{biomass, non-project}	5.6%	AMS-I.E	LE _y	Indirect. Check if leakage is to be considered	No leakage is considered as BE _{biomass,y,baseline} > BE _{biomass,non-project,y} (21.4 vs 15.4) no LE to be considered and precision is met
Application of sludge	8.4%	AMS-III.R	Precision met no further action required		

For parameter $B_{biomass, project}$ the precision result was not as expected. The reason is that only 6 out of the 367 HH use biomass during the project. Due to this the results have been stratified into two groups. Group 1 all HH not using any biomass anymore having a zero (0) value and group 2 the 6 HHs with biomass use. The precision for all zero valued HHs cannot be calculated. The precision for the 6 HHs is then 23.1% far better than before. However in this project the amount of fire wood used for cooking purpose has been fixed by the baseline survey. In the monitoring survey the fire wood consumption for cooking was checked and in case there is a relevant amount of biomass consumption observed it will be used for project emissions calculations. In this project the surveyed amount of biomass used in the project scenario was less 0.09% of the biomass consumption of the baseline and thus was considered as negligible.

For $B_{manure, fed}$ the precision was also not met. However this parameter is not used for calculation of emission reductions but only to check if the implemented capacity of the biodigester is sufficient. In the reg PDD it is already stated that measuring total amount of animal excreta is difficult and not practical and will lead to inaccurate results. Therefore the PP proposed to take animal confinement as the relevant parameter for ER calculation which has been accepted by the validating DoE and the UNFCCC.

Requested Deviation / Change #1

	<p>Considering the above that the precision is met, the value has no influence on the ER calculation, negligible or the lower bound value of the 90% interval is applied it is considered that the ER calculation is conservative and the accuracy is not adversely impacted. Based on check of ER calculation spreadsheet of first monitoring period it is noted that for all values the lower bound value for BE calculation is applied not only for the values for which the reliability is not met. Further DOE also calculated the ER result applying only the survey results with lower bound values of Dec 2013 and Feb 2014 and found that the total ER result for monitoring period 1 would be 25,294 tCO₂, 1.3% lower in comparison to the ER result applying all data of 25,634 tCO₂. Therefore the PP would apply only the result of the survey data from Dec 2013 and Feb 2014 for this monitoring period which is even more conservative.</p> <p>Based on that it is considered that the application of the data of the survey taken can be also applied for the Year 1 of the project activity.</p>
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Appendix 1 PS: Check if the changes fall under one of the scenarios of appendix 1 of the PS.	The above requested temporary deviation does not fall under one of the scenarios as given under appendix 1 of the PS.
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C. Revised PDD

Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<input type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input checked="" type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.
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D. Prior Approval

Prior approval: Assess whether the change requires prior approval of the board	<input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i> <input type="checkbox"/> <i>The post registration change does not require prior approval</i>
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Requested Deviation / Change #2

Type of change(s):	<input type="checkbox"/> Temporary Deviation from Monitoring Plan <input type="checkbox"/> Temporary Deviation from Monitoring Methodology <input checked="" type="checkbox"/> Corrections that do not affect the project design <input type="checkbox"/> Permanent Change from Monitoring Plan <input type="checkbox"/> Permanent Change from Monitoring Methodology <input type="checkbox"/> Changes specific to afforestation or reforestation
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A. Description of post registration change

Requested Deviation / Change #2			
Start Date: Please provide the start date of the change	01/04/2012	End Date: Please provide the end date of the change, if applicable	-
Description: Please give a detailed description of the change(s)	During revision of the PDD for this PRC the PDD has also been updated w.r.t. several editorial changes.		
B. Assessment of post registration change – Corrections			
Correctness: Please assess whether the corrected information (incl. ex-ante values) is an accurate reflection of actual project information.	The updated PDD has been checked and the editorial changes as applied correctly.		
MP/MM Compliance : Please check whether the corrected parameters are in accordance with the MM and/or MP.	n.a.		
Appendix 1 PS: Check whether the affect the design of the PA.	The changes are in Appendix 1 of PS.		
C. Revised PDD			
Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.		
D. Prior Approval			
Prior approval: Assess whether the change requires prior approval of the board	<input type="checkbox"/> <i>The post registration change requires prior approval</i> <input checked="" type="checkbox"/> <i>The post registration change does not require prior approval</i>		

Requested Deviation / Change #3

Requested Deviation / Change #3

- Type of change(s):
- ☐ Temporary Deviation from Monitoring Plan
 - ☐ Temporary Deviation from Monitoring Methodology
 - ☐ Corrections that do not affect the project design
 - ☒ Permanent Change from Monitoring Plan
 - ☐ Permanent Change from Monitoring Methodology
 - ☐ Changes specific to afforestation or reforestation

A. Description of post registration change

Start Date: Please provide the start date of the change	01/04/2012	End Date: Please provide the end date of the change, if applicable	-
Description: Please give a detailed description of the change(s)	<ol style="list-style-type: none"> 1. The ex-ante fixed value for parameter GWP_ CH4 has been changed from 21 to 25 for ER calc in the second commitment period and is now in line with the IPCC value given. 2. PDD has been updated to clearly distinguish between baseline and project related values of certain parameters e.g. $B_{\text{biomass,baseline}}$ and $B_{\text{biomass,project}}$. 3. EF_{kerosene}: Specification is made to the "additional comment" due to now included calculation of project emissions as per AMS-I.C applying value 73,700 kgCO₂/TJ kerosene. 		

B. Assessment of post registration change – Permanent changes from MP or MM

MM compliance: Please check in case of changes to the registered MP, whether they are in compliance with the MM.	<ol style="list-style-type: none"> 1. The value is based on IPCC (http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html) value which is in line with related methodology. 2. There is no specific requirement by the methodology for this distinguishing. However it leads to a clear and transparent calculation of emission reduction. 3. For parameter BE_{NRB} still the value in line with AMS I.E of 71.5 tCO₂/TJ is applied as per reg PDD. However the parameter EF_{kerosene} is based on applied methodology AMS I.C. AMS I.C refers for fossil fuel combustion to the tool "Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion" version 2.
Later version of MM: Please check in cases where compliance with a later version of the MM is demonstrated that the conservativeness of the monitoring and verification is not affected.	<ol style="list-style-type: none"> 1. The value is based on IPCC value which is in line with related methodology as well as in accordance to EB69 Annex 3. 2. Not applicable 3. The correct value as per requirement of related tool version 2 is applied.

Requested Deviation / Change #3	
Accuracy: Please give a detailed assessment whether the change is likely to lead to a reduction in the accuracy of the ER calculation.	1. After correction w.r.t. 1 st and 2 nd commitment period the value is applied correctly and in line with the related source 2. This specification leads to a higher accuracy and more transparent calculation of emission reduction. 3. In case the default value is applied the tool requires to apply the value of the upper limit of the 95% uncertainty from Table 1.4 of Chapter 1 Vol 2 (Energy) which is 73,700 kgCO ₂ /TJ for other kerosene. The same is applied correctly and the type is considered correctly chosen as the other kerosene provided is jet kerosene. As per onsite visit it can be confirmed that no jet kerosene is used in the remote regions.
Conservative-ness: Please give a detailed assessment whether conservative assumptions or discount factors have been applied to ensure that ER will not be overestimated.	1. After correction w.r.t. 1 st and 2 nd commitment period the value is applied correctly and in line with the related source even though the higher value of 25 leads to higher ER result. 2. It is a specification of the description therefore this is not applicable. 3. To apply the upper limit value of the uncertainty is considered to be conservative for calculating project emissions and in line with the tool.
Appendix 1 PS: Check if the changes fall under one of the scenarios of appendix 1 of the PS.	None of the changes above fall under appendix 1 of PS.
C. Revised PDD	
Rev. of PDD: Check whether the changes have been fully addressed in a revised PDD.	<input checked="" type="checkbox"/> The changes have correctly been reflected in the revised PDD. <input type="checkbox"/> A revision of the PDD is not required (in case of temp. changes). <input checked="" type="checkbox"/> The revised PDD has been forwarded in (i) track-change and (ii) clean version.
D. Prior Approval	
Prior approval: Assess whether the change requires prior approval of the board	<input checked="" type="checkbox"/> <i>The post registration change requires prior approval</i> <input type="checkbox"/> <i>The post registration change does not require prior approval</i>

3.2 Related Findings

The following table(s) include all raised CARs and CLs and the assessments of the same by the assessment team.

Finding	A1
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Finding	A1
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	MR version 3 and PDD version 12 both dtd 28/10/2014: It is stated that for GWP the value is updated to 25 according to IPCC value for 2 nd commitment period (see MR B.2.3). However 2 nd commitment period starts 1 st Jan 2013 but start date of the crediting period and related first monitoring period is 01/04/2012. Based on that first 9 months are prior to 2 nd commitment period for which this value is not applicable. Clarification and specification on the applied value for which time onwards as well as related revision is requested.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PDD has been revised
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	PDD version 13 dated 21/05/2015 has been updated and now states under value applied "21, 25". For first commitment period 21 will be applied for 2 nd commitment period 25. Hence finding is closed.
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed

Finding	A2
Classification	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL

Finding	A2
<p>Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>MR version 3 and PDD version 12 both dtd 28/10/2014:</p> <p>Updated PDD under “additional comment” states that this value is used for BE_{kerosene}. For BE_{NRB}, the default value specified in AMS I.E, 71,500 kg CO₂/TJ, is used. This is inconsistent to the requested PRC and updated ER calculation which applies a value of 71,900 kg CO₂/TJ under sheet “NRB”.</p> <p>Further the PRC states that the value is now consistent between AMS I.C and I.E however the latest version of AMS I.E applies a default value of 81.6 tCO₂/TJ as the methodology ver 6 states that “This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50 per cent weight is assigned to coal as the alternative solid fossil fuel (96 t CO₂/TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 t CO₂/TJ for kerosene and 63.0 t CO₂/TJ for liquefied petroleum gas (LPG)).”</p> <p>Further the value is used for calculating PE, $PE_{y,\text{NRB}}$ and PE_{kerosene}. PE_{kerosene} is due to fossil fuel consumption of the project activity. This is related to AMS I.C however such emissions have to be calculated as per related tool to calculate project emissions from fossil fuel consumption. This tool states that the EF has to be derived from fuel supplier invoice, measured by PP, regional or national default value or 2006 IPCC default value at the upper limit of the uncertainty at the 95% confidence interval as provided in Table 1.2 of chapter 1 of Vol 2.</p> <p>Finally as per PDD no change could be identified to version 11 PDD.</p> <p>Based on that clarify the stated description in MR B2.3 and requested related PRC.</p>
<p>Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>PDD under B.6.2 and Appendix 8 has been revised accordingly</p>



Finding	A2
<p>DOE Assessment #1</p> <p><i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>Updated PDD version 13 states now as following:</p> <p>B.6.2:</p> <p>For Project Emissions based on AMS.I.C, as per defined tool the upper value of 73,700 kg CO₂/TJ for kerosene is used.</p> <p>Appendix 8:</p> <p>The parameter EF_kerosene used under AMS-I.C has been changed from 71,500 kg CO₂/TJ to 73,700 kg CO₂/TJ for the project emissions and is now in line with the methodological tool used (am-tool-03-v2). The Emission Reduction Calculations are now more conservative, because the value used for calculation of project emissions is higher.</p> <p>The related default value for project emissions under AMS I.C have now been corrected to the related tool which requires using the upper limit of uncertainty value of IPCC which is 73,700 kg CO₂/TJ. The calculation method for PE under AMS-I.C is as per methodology and tool.</p> <p>Hence CAR is closed.</p>
<p>Conclusion</p> <p><i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input checked="" type="checkbox"/> The finding is closed</p>

4 CHANGE TO THE START DATE OF THE CREDITING PERIOD

The post registration changes do not fall under this category.

5 CHANGES TO THE PROJECT / PROGRAMME DESIGN

5.1 Assessment of Changes

Requested Changes to the project design #1			
Type :	<input checked="" type="checkbox"/>	<i>Changes to the project design</i>	
	<input type="checkbox"/>	<i>Changes to the PoA design</i>	
A. Description of post registration change			
Start Date: Please provide the start date of the change	01/04/2012	End Date: Please provide the end date of the change, if applicable	31/03/2022
Description: Please give a detailed description of the changes esp. with regards to the effect on the project design.	<p>The biogas implementation plan has been adapted to the current status. Number of units installed per year has been corrected down.</p> <p>Number of Total units installed under the project activity has been corrected down from 10,000 units to 9,380 units.</p> <p>The PDD has been updated w.r.t. provisions for project emissions as per AMS-I.C methodology.</p>		
B. Applicability and application of the Approved Baseline Methodology			
Description: Please give a detailed description on how the changes affect the applicability and application of the approved Baseline Methodology. Check if the actual changes would adversely affect the conclusions during validation.	<p>The change refers to the quantity of units to be installed under the project activity the change does not affect the application of the approved baseline methodology.</p> <p>Besides see below assessment w.r.t. the threshold limits for Type I and Type III small scale project activities. Both thresholds cannot be exceeded as the total number of units is decreasing even though also the parameters GWP and $EF_{kreosene}$ have been adjusted w.r.t. 2nd commitment period.</p>		
C. Additionality assessment			

Requested Changes to the project design #1

Description:

Please give a detailed description re-assessment of additionality. Check whether the actual changes would adversely affect the conclusions during validation. If required please make use of the assessment tables in the annex.

Methodology:

In the original project documentation the additionality was justified in line with the requirements as per tool for the demonstration and assessment of additionality ver 5.2 in combination with non-binding best practice examples to demonstrate additionality for SSC project activities (Annex 34 of EB 35).

Decisive Route of Additionality Justification

During the original validation of the project the additionality was justified on the basis of a barrier analysis and a financial analysis. As per PDD the relevant barrier would be the investment barrier. An investment analysis was conducted by applying simple cost analysis. The simple cost analysis conducted an analysis of average annual costs. Average annual costs of the project activity and each alternative scenario = (capital cost / technology lifetime) + annual fuel costs + annual maintenance costs. Further see Annex 2 and 3 to this report.

Re-Assessment of Additionality

During this validation the applied change is on the total number of units to be installed under this project activity. This number is reduced from 10,000 to 9,380 units. As the additionality is demonstrated based on simple cost analysis comparing the costs of a project unit in contrast to alternative applications and as this is done for one single application/unit or on household level, the total number of units installed under the project activity has no influence on the simple cost analysis and additionality at all. The previously applied values are still valid and applicable. No changes to the input parameter are therefore applicable. The same for the barrier identified. The number of all digesters has no influence on the access to capital demonstrated for one system. See Annex 2 and 3 to this report for further info.

Result of Additionality Re-Assessment

No input parameter has been changed nor has any input parameter been influenced due to the applied post-registration-change. The change refers to a reduced amount of units to be installed under the project activity as previously considered. The reason for the reduction is mainly due to the issues that now already progress of the project can be compared to previous estimation.

Thus the validation team has arrived at the conclusion that the additionality of the project is not affected by the technical changes carried out as a deviation from the project design originally validated and registered.

D. Scale of the Project activity

Requested Changes to the project design #1

Description:

Please give a detailed regarding the effect of the changes on the scale of the PA (i.e. LSC or SSC).

This is a small scale project activity applying three methodologies. As the related threshold limits have been already proven during previous initial submission and the number of units has been reduced from 10,000 to 9,380 difference to the threshold has increased not decreased. Therefore the small scale thresholds cannot be exceeded due to the applied change in number of units. The PDD has been updated in section B.2 accordingly and providing updated values:

Methodology	Threshold	Project
AMS-I.C./ AMS-I.E	45 MW _{thermal}	Average capacity of one unit is 2.97kW. Total capacity of the project: 9,380 x 2.97 kW = 27.8586 MW
AMS-III.R	60 kt CO ₂ e	As per registered and updated PDD as well as related ER calc spreadsheets the annual emission reduction due to methane avoidance per unit is 2.36 (2 m ³ digester) and 3.54 tCO ₂ e (3 m ³ digester) considering 30% of the units will 3 m ³ digester and the rest 2 m ³ the annual total ER due to methane avoidance is 25,457 tCO ₂ e (not rounded) (9,380 x (70% x 2.36 + 30% x 3.54)). Considering the higher methane factor of 25 for 2 nd commitment period the annual ER reduction would be 30,297 tCO ₂ (9,380 x (70% x 2.81+30% x 4.21)) Even considering only 3 m ³ units the total reduction would be 39,490 tCO ₂ e (9,380 x 4.21) still approx 1/3 below the threshold.

Based on the above stated the DOE is convinced that the related thresholds are not exceeded.

E. Revised PDD

Requested Changes to the project design #1

Rev. of PDD:

Check whether the changes have been fully addressed in a revised PDD. In this context pl. refer to

- Changes in the effective output capacity.
- Addition of components or extension of technology
- In case of multiple site projects: Removal or addition of sites
- Operational parameters under the control of PPs differing from expected parameters
- Changes to the baseline Meth (e.g. addition of a new Meth or change of the BL scenario.
- Effects with regards to B, C and D above incl. compliance with the MP and level of accuracy and completeness of monitoring.

The post registration change has correctly been reflected in the revised PDD. This assessment is based on the following considerations:

- ☒ By means of checking revised PDD with updated ER estimation, interview conducted during onsite visit as well as onsite observations and further document check. Besides see above stated assessments.

Traceability:

Check if the PPs have provided a revised PDD in both clean and track-change version.

- ☒ The revised PDD has been forwarded in (i) track-change and (ii) clean version.

F. Prior Approval

Prior approval:

Assess whether the change requires prior approval of the board.

- ☒ The changes do not raise concerns with respect to aspects outlined in the PS:
- a. applicability and application of the Approved Baseline Methodology under which the project activity has been registered.
 - b. additionality of the project
 - c. scale of the CDM project activity and
- Prior Approval by the Board is not required.

- ☐ The post registration change requires prior approval.

5.2 Related Findings

The following tables include all raised CARs and CLs and the assessments of the same by the assessment team.

Finding	A1	
Classification	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PDD version 12 dtd 28/10/2014: Section B.2 of the PDD states that the aggregate capacity of 9,380 systems is in the order of 2.97 MW. However recalculation based on average capacity of a unit of 2.97 kW results in 27.8586 MW (9,380 x 2.97 kW / 1000). Therefore correction requested.	
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PDD has been updated accordingly.	
DOE Assessment #1 <i>The assessment shall encompass all open issues in annex A-1. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Based on check of PDD version 13 dtd 21/05/2015 section A.3 the value has been corrected as well as related justification calculation. However section B.2 of the PDD at corresponding points refers to the wrong sections. E.g. w.r.t. project location to section A.4.5 and w.r.t. the reference for total capacity to A.4.2. But the PDD template does not have related section any more. Further the entire PDD may be checked w.r.t. referencing. Besides also inconsistent versioning of methodology is identified in section Revision requested.	
Corrective Action #2	PDD has been updated accordingly.	
DOE Assessment #2	Updated PDD version 14 dtd 18/06/2015 has been checked and section B.2 the references have been corrected and refer to the related section in PDD. Also the version of the methodology is corrected to version 18. Hence this CAR is closed.	
Conclusion <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> Additional action should be taken (finding remains open) <input checked="" type="checkbox"/> The finding is closed	

6 SUMMARY OF ASSESSMENT OPINIONS

The below listed changes have occurred after the registration of the project / PoA.

Type of Change occurred	Total No. of changes	No. of changes which require prior approval
<input checked="" type="checkbox"/> Temporary deviations from the MP	1	1
<input type="checkbox"/> Temporary deviations from the MM		
<input checked="" type="checkbox"/> Corrections that do not affect the project	several	
<input type="checkbox"/> Change to the start date of the crediting p.		
<input checked="" type="checkbox"/> Permanent changes from the MP	3	3
<input type="checkbox"/> Permanent changes from the MM		
<input checked="" type="checkbox"/> Design changes to the project activity / PoA	2	2
<input type="checkbox"/> Changes specific to AR projects		

The above listed post registration changes require prior approval of the Board.

Essen, 2015-07-15



Stefan Winter
TÜV NORD JI/CDM CP
Assessment Team Leader

Essen, 2015-07-15



Rainer Winter
TÜV NORD JI/CDM CP
Final Approval

7 REFERENCES

Table 7-1: Documents provided by the project participant

Reference	Document
/INV/	Investment analysis spreadsheet dated 11/04/2010 submitted along registration request
/PDD1/	Project Design Document named "Kolar Biogas Project" registered version 11 dated 11/04/2011
/PDD2/	Revised PDD in clean and track-change reflecting the intended / implemented changes version 12 dated 28/10/2014 Revised PDD in clean and track-change reflecting the intended / implemented changes version 13 dated 21/05/2015 Revised PDD in clean and track-change reflecting the intended / implemented changes version 14 dated 18/06/2015
/MR/	Monitoring report of the project titled "Kolar Biogas Project" version 1.0 dated 25/06/2014 Monitoring report of the project titled "Kolar Biogas Project" version 2.0 dated 17/09/2014 Monitoring report of the project titled "Kolar Biogas Project" version 3.0 dated 27/10/2014
/NRB/	Ramachandra T.V. and Rao, G.R. Inventoryinf, Mapping and Monitoring Bioresources Using GIS and Remote Sensing (Kolar District) 2005 http://www.ces.iisc.ernet.in/energy/paper/Biores_using_GIS/index.htm
/PAF/	Project Application forms by SKG Sangha
/TEMP/	Standardized forms/templates on <ul style="list-style-type: none"> • Agreement for providing bio-digester under Kolar biogas project • Agreement for providing assistance under Kolar biogas project • Completion certificate • Receipt of payment
/AGT/	Sample of the following: <ul style="list-style-type: none"> • Agreement for providing bio-digester under Kolar biogas project • Agreement for providing assistance under Kolar biogas project • Completion certificate • Receipt of payment
/PI/	Project info note by SKG Sangha

Reference	Document
/ER/	Emission Reduction Sheet version 5 w.r.t. monitoring report version 1.0 dated 25/06/2014 Emission Reduction Sheet version 6 w.r.t. updated applied for this PRC dated 21/05/2015 Emission Reduction Sheet version 4 related to first monitoring period

Table 7-2: Background investigation and assessment documents

Reference	Document
/AMS/	AMS-I.C. version 18 : “Thermal energy for user with or without electricity” AMS-I.E version 3 : “Switch from non-renewable biomass for thermal applications by the user” AMS-III.R version 1 : “Methane recovery in agricultural activities at the household/small farm level”
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/PDD-T/	Project Design Document Form (F-CDM_PDD) - Version 5.0
/TA/	<ul style="list-style-type: none"> • Tool for the demonstration and assessment of additionality (Ver. 7) • Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (Ver. 2) • Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Ver. 1)
/RLT/	Spreadsheet on reliability test calculation by DOE
/VAL/	Final Validation report “Kolar Biogas Project” version 2.2 dtd 28/06/2011 by SGS
/VVS/	CDM Validation and Verification Standard (Version 7)

Table 7-3: Websites used

Reference	Link	Organisation
/unfccc/	http://cdm.unfccc.int	UNFCCC
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/moef/	www.envfor.nic.in http://planningcommission.go	Ministry of Environment and Forest

Reference	Link	Organisation
	v.in/reports/genrep/rep_inten gy.pdf	
/mnre/	http://mnre.gov.in/schemes/decentralized-systems/schems-2/ http://envfor.nic.in/divisions/ic/wssd/doc2/ch4_anx.pdf	Family Type Biogas Plants Programme, National Biogas and Manure Management Programme (NBMMP)

Table 7-4: List of interviewed persons

Reference	Mol ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms	Kiran Kumar K	Secretary , M/s SKG Sangha
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	K. V Anand	Kuppahally, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	T. V Manjula	Therahalli , Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Santhamma	Therahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Anusha	Therahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	M. Nagarjan	Madanahath, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Shobha	Purahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Mangala	Vandanahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Anand O.B	Harahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Bhagaymamma	Mavahalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	N. S Gopalappa	Santhehalli, Kolar District
/IM02/	V	<input type="checkbox"/> Mr.	Maramma	Sonnappannahalli, Kolar District



Reference	Mol ¹		Name	Organisation / Function
		<input checked="" type="checkbox"/> Ms.		

¹⁾ Means of Interview: (**T**elephone, **E**-Mail, **V**isit)

APPENDIX

- A1:** Assessment of Financial Parameters
- A2:** Assessment of Barrier analysis
- A3:** Competence statements of involved personnel

APPENDIX 1: ASSESSMENT OF FINANCIAL PARAMETERS

Table A-1: Assessment of Financial Parameters (VVS, §§ 120, 121 / in case financial parameters stem from FSR §122)

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Average annual capital cost	Kerosene: 80 INR LPG: 120 INR Traditional stove: 3.33 INR Biogas system: 1,044.95 INR Three-stone stove plus subsidized kerosene: 0 INR	INR	Registered PDD page 24 Validation report page 135, 138, 143	/PDD1/ /VAL/	<input checked="" type="checkbox"/>	There is no change in the applied values. Further the financial analysis, simple cost analysis has been conducted for one single system or household. As the change is a change of the total number of installed systems/units no change in any input parameter is possible or required.
Annual fuel cost	Kerosene: 2,000 INR LPG: 2,829 INR Traditional	INR	Registered PDD page 24 Validation report page 135, 138, 143	/PDD1/ /VAL/	<input checked="" type="checkbox"/>	There is no change in the applied values. Further the financial analysis, simple cost analysis has been conducted for one single system or household. As the change is a change of the total number of installed systems/units no change in any input

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
	stove: 1,395 INR Biogas system: 0 INR Three-stone stove plus subsidized kerosene: 360 INR					parameter is possible or required.
Annual maintenance expenses	Kerosene: 25 INR LPG: 75 INR Traditional stove: 0 INR Biogas system: 500 INR Three-stone stove plus subsidized kerosene: 0 INR	INR	Registered PDD page 24 Validation report page 135, 138, 143	/PDD1/ /VAL/	<input type="checkbox"/>	There is no change in the applied values. Further the financial analysis, simple cost analysis has been conducted for one single system or household. As the change is a change of the total number of installed systems/units no change in any input parameter is possible or required.

<input type="checkbox"/>	No financial parameters are used for additionality justification					
<input checked="" type="checkbox"/>	Assessment of all financial parameters see below					
Parameter	Value applied	Unit	Source of Information (please indicate document and page)	Reference	DOE ASSESSMENT	
					Correctness of value applied	Comment
Average annual costs	Kerosene: 2,105 INR LPG: 3,024 INR Traditional stove: 1,398.33 INR Biogas system: 1,544.95 INR Three-stone stove plus subsidized kerosene: 360 INR	INR	Registered PDD page 24 Validation report page 135, 138, 143	/PDD1/ /VAL/	<input checked="" type="checkbox"/>	There is no change in the applied values. Further the financial analysis, simple cost analysis has been conducted for one single system or household. As the change is a change of the total number of installed systems/units no change in any input parameter is possible or required.

APPENDIX 2: ASSESSMENT OF BARRIER ANALYSIS

Table A-2: Assessment of Barrier Analysis (VVS, §§ 124-127)

<input type="checkbox"/>		No barrier parameters are used for additionality justification		
<input checked="" type="checkbox"/>		Assessment of barriers see below		
Kind of Barrier (invest, tech, other)	Description of Barrier	Evidence used	Assessment of validation team	
			Appropriateness of information source	Explanation of final result
Access to finance	A household could not afford the bio-digester without the 73% cost subsidiary. The cost of a digester system is in the range of 82% - 103% of the average annual HH income.	/PDD1/ /VAL/ /IM01/	<input checked="" type="checkbox"/>	As per PDD and Validation report the digester system costs are 20,899 INR (2 m ³) or 26,219 INR (3 m ³). As per evaluation study on national project on biogas development, programme evaluation organization, Planning commission, Government of India, New Delhi (2002) the average annual income of farmers is 49,640 INR. The decrease in number of included digesters substantiates this as well as the fact that at onsite visit and verification of first monitoring period 4,079 units have been installed and are operating end of 2014 but as per registered PDD already 10,000 units (end 2014), the total number, should have been installed. This delay in installation is due to the fact of delay in raising related funds to subsidies the digester systems. This is based on interview with PP and client.

APPENDIX 3: STATEMENTS OF COMPETENCE OF INVOLVED PERSONNEL

TÜV NORD
Certification

Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Rainer Winter

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2013-07-03
J1	Senior Assessor Technical Reviewer	2013-07-03
VCS	Senior Assessor Technical Reviewer	2013-07-03

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal Energy Generation	1.2.1 Hydro 1.2.2 Wind 1.2.3 Geothermal 1.2.4 Solar 1.2.5 Tidal
1.2	Renewable Energies	
4.1	Cement Sector	
4.3	Iron and Steel	
4.5	Waste Heat Recovery	
5.1	Chemical Process Industries	
9.1	Metal Production	
11.1	Chemical Process Industries	
11.2	GHG Capture and Destruction	
12.1	Chemical Process Industries	
13.1	Waste Handling and Disposal	13.1.1 Waste Management

003 – Rev. 5, Date: 2011-08-01

003_S01-F203_2011-08-01_rev5 S01-F203 rev3 / 2010-04-19

TÜV NORD
Certification

Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Indrapal Parmar

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2018-01-06
VCS / ISO 14064-2	Lead Assessor	2018-01-06

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.2	Renewable Energies	

191 - Rev. 4, Date: 2015-01-07

191_S01-VA080-F20_2015-01-07_rev4.doc S01-VA080-F20 rev3 / 2012-10-25

TÜV NORD
Certification

Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Mohinder Amarnath B.J.

SCHEME	STATUS	VALID UNTIL
CDM	Lead Assessor (Validation, Verification)	2016-10-28
VCS / ISO 14064-2	Lead Assessor	2016-10-28

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal Energy Generation*
1.2	Renewable Energies
3.1	Energy Demand
4.1	Cement Sector
4.5	Waste Heat Recovery*
13.1	Waste Handling and Disposal

* Limited to validation and verification contracts signed by 17 June 2013

053 - Rev. 3, Date: 2013-10-29

053_S01-VA080-F20_2013-10-29_rev3 S01-VA080-F20 rev3 / 2012-10-25



Statement of Competence
Appointment and authorization according to the procedures
of the TÜV NORD JI/CDM Certification Program

Mr. Stefan Winter

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2017-07-27
	Technical Reviewer	
VCS	Senior Assessor (Validation, Verification)	2017-07-27
	Technical Reviewer	

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA	TR SUBCATEGORIES
1.1	Thermal energy generation	
1.2	Renewable Energy	1.2.1 Hydro
		1.2.2 Wind
		1.2.3 Geothermal
		1.2.4 Solar
		1.2.5 Tidal
2.2	Heat distribution	
3.1	Energy demand	
13.1	Waste handling and disposal	13.1.1 Waste management
		13.1.2 Waste water management
13.2	Animal waste management	
15.2	Animal waste management	

163 – Rev. 3, Date: 2014-07-28

163_001-F003_2014-07-28_rev3.doc

001-F003 rev1 / 2011-08-02