



**Verification and certification report form for
CDM project activities
(Version 03.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	IOT Mabagas Limited power plant, Pudhuchatram Reference number :8288
Scale of the project activity	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
Version number of the verification and certification report	4.0
Completion date of the verification and certification report	13/03/2020
Monitoring period number and duration of this monitoring period	Second monitoring period, 01/08/2015 to 31/08/2017
Version number of the monitoring report to which this report applies	Version 6
Crediting period of the project activity corresponding to this monitoring period	01/01/2013 – 31/12/2022, Fixed, 10 years
Project participants	IOT Mabagas Limited (IML) Carbonbay GmbH & Co. KG
Host Party	India
Applied methodologies and standardized baselines	AMS-III.AO. version 1.0 - Methane recovery through controlled anaerobic digestion AMS-I.D. ver. 17 - Grid connected renewable electricity generation Standardized baseline: NA
Mandatory sectoral scopes	AMS-I.D. ver. 17 - SS 1 : Energy industries (renewable - / non-renewable sources) AMS-III.AO. - SS 13 : Waste handling and disposal
Conditional sectoral scopes, if applicable	AMS-I.D. ver. 17: SS 13: Waste Handling and disposal, SS 15: Agriculture AMS-III.AO. - NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	46,608 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	19,193 tCO ₂ e
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited E-0066

Name, position and signature of the approver of the verification and certification report	 Ashok Kumar Gautam Director
--	--

SECTION A. Executive summary

The project activity involves production of 2.4 MW of renewable energy through anaerobic generation of biogas from poultry litter, cow dung and agricultural waste in the village of Thattayangarpatti, in the Puduchatram block of Namakkal district. Generation of clean energy leads to reduction of Green House Gas (GHG) emission that are real, measurable and verifiable and also plays beneficial role in the mitigation of climate change. As verified through commissioning certificate/36/ the project activity got commissioned on 19/12/2012 and is operational since as verified through various plant records as elaborated sections further in report.

The project activity comprises of following components:

S.No	Component	Serial No.	Capacity
1.	Primary digester-1	RO2O1	Total capacity of 16,000m ³
2.	Primary digester-2	RO2O3	
3.	Secondary digester-1	RO2O2	
4.	Secondary digester-2	RO2O4	
5.	Biogas engines (2 Nos)	GG#1, GG#2	2.4 MW total capacity

After the generation of electricity using the above components it is fed into dedicated 22kV transmission line feeder to nearby substation. Details of all the components was verified through onsite visit.

The assessment team confirms that the total emission reductions achieved under this monitoring period 01/08/2015 to 31/08/2017 (including both days) are 19,193 tCO₂e.

The basic details of the project activity are mentioned below:

Project title	IOT Mabagas Limited power plant, Pudhuchatram
UNFCCC registration number	8288
Date of registration	29/11/2012
Sectoral scope	1 : Energy industries 13 : Waste handling and disposal
Methodology/ies applied	AMS-III.AO. ver.01 - Methane recovery through controlled anaerobic digestion AMS-I.D. ver. 17 - Grid connected renewable electricity generation
Project participant	IOT Mabagas Limited (IML) Carbonbay GmbH & Co. KG
Location of Project Activity	Village - SF. Nos.52/1, 52/2, 53/1A and 53/2A Thattayangarpatti, Block - Pudhuchatram, District - Namakkal State - Tamil Nadu
Geographical coordinates	11°23'29.64"N by 78°10'41.44"E

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y
2.	Verifier	IR	Gupta	Anshika	Central Office	Y	N	N	Y
3.	Local Expert	IR	Gupta	Anshika	Central Office	Y	N	N	Y

4.	Technical Expert (1.1 & 13.1)	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y
5.	Methodology Expert	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Garg	Shreya	Central Office
2.	SS expert to TR	IR	Gautam	Ashok	Central Office
3.	Approver	IR	Gautam	Ashok	Central Office

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Error in transferring the recorded data to ER sheet	High	The procedure for transferring the recorded data for each parameter from its source to the spreadsheet is manual in nature thus increasing the chances of error.	All monthly reported values in ER sheet to be verified with the source of parameter values.
2.	Error in recording of data	High	The project requires more than one monitoring equipment in the whole process of ER calculations. They might show wrong readings and be out of calibration.	The calibration certificates to be checked and also the NABL accreditation of the testing agency

C.2. Consideration of materiality in conducting the verification

In accordance with the CDM VVS for PA Version 02 para 326/33/ the thresholds for materiality for CDM PAs are under:

Emission Reductions (tCO ₂ e)/year	500,000 or more	300,001 to 499,999	300,000 or less	Small Scale CDM PAs	Micro Scale CDM PAs
Materiality Threshold (para 326)	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 5.0 % as project activity is a small scale CDM PA.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO ₂ e) in this monitoring period	23,772	19,193
Applicable Threshold (%) as per para 326 of CDM VVS for PA Version 2	5.0%	5.0%

Monitored parameters checked are as follows:

					Impact on ERs
--	--	--	--	--	---------------

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total) Total (100%)	Sample selected for verification Sample (%)	Type of error identified	100% of data has been verified. Extrapolation of impact is not required.
EG _{gross,y} , GWh/y	The parameter is monitored continuously and reported monthly	25 (100%)	25 (100%)	No error	No impact
EGBL, GWh/y	The parameter is monitored continuously and reported monthly	25 (100%)	25 (100%)	No error	No impact
ECPJ,y, GWh/y	The parameter is monitored continuously and reported monthly	25 (100%)	25 (100%)	No error	No impact
Q _{i,y} , t/y	Each truck loading is monitored and reported monthly.	25 (100%)	25 (100%)	No error	No impact
Q _{res waste,y} , t/y	Each truck is monitored and monthly reported.	25 (100%)	25 (100%)	No error	No impact
wCH ₄ , %	Parameter is monitored continuously, recorded every hourly and reported monthly	25 (100%)	25 (100%)	No error	No impact
FVRG _h , m ³ /h	Measured continuously, recorded every 10 minutes and reported monthly	25 (100%)	25 (100%)	No error	No impact
BG _{combusted,y} , m ³ /y (normalized)	Measured continuously, recorded every ten minutes and reported monthly and yearly	25 (100%)	25 (100%)	No error	No impact
BG _{flared,y} , m ³ /y (normalized)	Measured continuously, recorded half hourly and reported monthly	25 (100%)	25 (100%)	No error	No impact
Frequency of tilling, Number	Daily	761(100%)	761(100%)	No error	No impact
FC _{Diesel} , Litres	Monitored daily and reported monthly	25 (100%)	25 (100%)	No error	No impact
T _{flare} , Deg C	Monitored continuously, recorded half hourly and reported monthly.	25 (100%)	25 (100%)	No error	No impact

Individual bird	It is calculated and annually recorded	2(100%)	2(100%)	No error	No impact
DAF _{w,i} , km/truck	Daily(on truck basis)	15* (100%)	15* (100%)	No error	No impact
DAF _{res} waste, km/truck	Daily(on truck basis)	3* (100%)	3* (100%)	No error	No impact
APP _{comp} , %-age	Sampled on each truck basis	-	-	No error	No impact

* Sampled values as reported in ER sheet were verified using weighbridge slips for exported fertilizer

100% of data has been checked by the verifying DOE. All the errors identified have been corrected and extrapolation of impact is not required. The verifying DOE confirms that the total ERs are free from material errors.

SECTION D. Means of verification

D.1. Desk/document review

Earthood conducted a desk review as under::

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

In addition to the monitoring documentation, Earthood has reviewed::

- The PDD and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PDD, and the corresponding validation opinion.
- The Validation Report.
- The applied monitoring methodology.
- The monitoring report (all versions) to verify that it is as per the standardized format.
- Any other information and references relevant to the project activity's emission reductions (e.g. IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).

The complete list of documents reviewed is included under Appendix 3.

D.2. On-site inspection

Duration of on-site inspection: 17/08/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	<p>An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised PDD.;</p> <p>A review of information flows for generating, aggregating and reporting the monitoring parameters.;</p> <p>Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD.;</p> <p>A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources.;</p> <p>A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline.;</p> <p>A review of calculations and assumptions made in determining the GHG data and emission reductions.;</p> <p>An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters</p>	Village - SF. Nos.52/1, 52/2, 53/1A and 53/2A Thattayangarpat ti, Pudhuchatram, Namakkal, Tamil Nadu, India	17/08/2018	Kaviraj Singh

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Purushottam	Ravishankar	IOT	17/08/2018	Project implementation, monitoring plan	Kaviraj Singh,
2.	Chinnusamy	Sivakumar	IOT	17/08/2018	Monitoring plan, sampling, recording and reporting of data, emission reduction calculation	Kaviraj Singh

D.4. Sampling approach

No sampling approach has been applied by the verification team.

D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	CAR#04 CAR#05	-

Compliance of the project implementation and operation with the registered PDD	-	CAR#03	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-		-
Compliance of monitoring activities with the registered monitoring plan	-	CAR#02, CAR#06, CAR#08, CAR#09 CAR#10 CAR#11, CAR#13, CAR#14	-
Compliance with the calibration frequency requirements for measuring instruments	-	CAR#07, CAR#15	-
Assessment of data and calculation of emission reductions or net removals		CAR#01, CAR#12,	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation		-	-
Others (please specify)	-	-	-
Total	-	15	-

SECTION E. Verification findings

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

Means of verification	The monitoring report form used is CDM-MR-FORM version 7.0 /14/ which was the appropriate form and the latest version available at the time of verification, as verified through UNFCCC webpage.
Findings	CAR#05 and CAR#04 were raised and resolved. Refer to appendix 4 for details.
Conclusion	All the sections of the form were filled as per the guidelines and gave all the relevant details. The revised monitoring report /2/ was found to be in compliance with the applicable latest monitoring report form and instructions therein.

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

There are no FARs raised during validation as checked from the validation report/4/ and verification report of previous monitoring period/52/ which requires to be closed during this verification.

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

Means of verification	As verified through onsite visit, the project activity is generating electricity using poultry litter in addition with agricultural waste and cow dung. All the equipment as listed in MR and found functional onsite are as follows:			
	S.No	Component	Serial No.	Capacity
	1.	Primary digester-1	RO2O1	Total capacity of 16,000m ³
	2.	Primary digester-2	RO2O3	
	3.	Secondary digester-1	RO2O2	
	4.	Secondary digester-2	RO2O4	
	5.	Biogas engines (2 Nos) 1. GG1-2209619 2. GG2-2209623	GG#1, GG#2	2.4 MW total capacity
	As observed onsite and verified through interviews and document review, project activity involves generation of electricity using poultry and agricultural waste along with cow dung using a bio-methanation process. The generated electricity is being			

	<p>supplied to state electricity board as verified through power purchase agreement/37/ and invoices issued for net export of electricity/32/. The plant started commercial operation on 19/12/2012 which was verified through commissioning certificate/36/ issued by Tamil Nadu Generation and Distribution Corporation Limited, however the emission reductions have been claimed 01/01/2013 onwards which is also the start date of the crediting period.</p> <p>The project activity has proposed temporary deviation and permanent changes to the monitoring plan which are discussed under the next section E.4.</p> <p>During the monitoring period there were no events or situations that could affect the applicability of applied methodologies/5,6/ as verified through plant records of all the parameters discussed in detail in section E.6. below.</p> <p>The emission reduction achieved in this monitoring period are 19,193 tCO₂e which is lower than the estimated ERs as per registered PDD (46,608tCO₂e)</p>
Findings	CAR#03 was raised and resolved. Refer to appendix 4 for details.
Conclusion	<p>Assessment concludes the following:</p> <ul style="list-style-type: none"> a) The implementation status of project activity was found to be in compliance with revised PDD/1/. b) DOE has conducted the on-site visit to confirm the implementation status of the project. c) The commissioning date of the project activity was found to be accurately and consistently recorded. d) The actual operation of project activity was found to be in compliance with the flow diagram provided in revised PDD/1/. e) There was no increase in emission reduction from estimates made in revised PDD/1/, therefore no additional explanation was sought from PP regarding the same. <p>This is in compliance with VVS for PA Version 02/9/.</p>

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹

Due to failure of hardware and software from PLC/SCADA system, the PP has been unable to monitor the parameter ID.23./wCH₄ (methane %). PP has applied a value '0' for this parameter during the deviation period.

The values of the parameter ID. 24./FV_{RG,h}, ID.25./BGcombusted,y and ID.26./BGflared,y were also not recorded as per the set frequency.

However, the PP has applied a conservative approach to account for the project emission from flaring and physical leakage for this period. The maximum values of flow rate for all the above parameters monitored since the start date of crediting period has been taken as a conservative approach during the not monitored period. The correctness and conservativeness of the applied values are assessed in detail in the PRC validation opinion/54/.

The PRC request for the deviation has been submitted along with this issuance request/54/.

E.4.2. Corrections

PP has proposed following corrections to the PDD:

- (a) The inputs in calculation of parameter EF_{CO₂,transport} is corrected and consistently reported in the PDD now.
- (b) The ID number of parameters have been updated under section B.7.3.
- (c) The contact details of PP have been under Appendix 1.

¹ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

The PRC request is submitted along with this issuance request/54/.

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

Not applicable

E.4.4. Inclusion of a monitoring plan

Not applicable

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

The PP has proposed the following permanent change to the registered monitored plan:

The PP has proposed to change the calibration frequency of monitoring equipment used to monitor ID. 19./EGBL,y (Net electricity supplied by the project activity to the grid) and ID. 20./ECPJ,y(Net electricity imported from the grid in case the Power units are not operating). Earlier the frequency was once in three years which has been changed to once in five years.

The PRC request is submitted along with this issuance request/54/.

E.4.6. Changes to the project design

Not applicable

E.4.7. Changes specific to afforestation and reforestation project activities

Not applicable

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	The review of applied methodologies AMS-III.AO (ver.01), AMS-I.D. (ver. 17), and monitoring plan as contained in revised PDD/1/, establishes that the monitoring plan is consistent with the applied methodology/5,6/ and revised PDD.
Findings	None
Conclusion	The monitoring plan is in accordance with the applied methodology /5,6/ and correctly applied by the registered CDM project activity.

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

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

E.6.1.1. CO₂ emission factor of the Southern grid, in which the project activity displaced the electricity during the year y, ID. 1./ $EF_{grid,CM,y} = EF_{EL,y}$, tCO₂/GWh

Means of verification	The revised PDD/1/ gives the value of 865 tCO ₂ /GWh for this parameter. PP has used the data of "CO ₂ Emission Database", version 6 published by the Central Electricity Authority, Ministry of Power, Government of India/39/
Findings	No findings.
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.2. Operating Margin Emission Factor of the Southern grid, ID. 2./ $EF_{grid,OM,y}$, tCO₂/GWh

Means of verification	The revised PDD/1/ gives the value of 966 tCO ₂ /GWh for this parameter. PP has used the data of "CO ₂ Emission Database", version 6 published by the Central Electricity Authority, Ministry of Power, Government of India/39/
Findings	No findings.
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.3. Build Margin Emission Factor of the Southern grid, ID. 3./ $EF_{grid, BM, y}$, tCO_2/GWh

Means of verification	The revised PDD/1/ gives the value of 763 tCO_2/GWh for this parameter. PP has used the data of "CO ₂ Emission Database", version 6 published by the Central Electricity Authority, Ministry of Power, Government of India/39/
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.4. Global Warming Potential (GWP) of methane, ID. 4./ GWP_{CH_4} , CH_4

Means of verification	The revised PDD/1/ gives the value of 21 for this parameter. However. The PP has applied 25 as the value of the parameter following the guideline release under second commitment period/57/. PP has used the data of applied methodology AMS-III.AO version 01/5/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.5. Density of methane at normal conditions, ID. 5./ $D_{CH_4} = \rho_{CH_4, n}$, kg/m^3

Means of verification	The revised PDD/1/ gives the value of 0.67 kg/m^3 for this parameter. PP has used the data of Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use, authored by IPCC/10/
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.6. Methane conversion factor for manure management (Only for poultry litter), ID. 6./ MCF_j , %

Means of verification	The revised PDD/1/ gives the value of 22.84% for this parameter. PP has used the data of Methane Emission Potential of Poultry Litter (October 2011) issued by Tamil Nadu Agricultural University/40/
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.7. Maximum methane production potential (in the baseline situation). $LT = \text{Livestock} = \text{poultry}$, ID 7./ B_o, LT , $m^3_{CH_4}/kg$

Means of verification	The revised PDD/1/ gives the value of 0.24 $m^3_{CH_4}/kg$ for this parameter. PP has used the data of Guidelines for National Greenhouse Gas Inventories issued by IPCC in 2006/10/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.8. Volatile solids for livestock LT, ID. 8./ $VS_{default}$, $Kg/head/day$

Means of verification	The revised PDD/1/ gives the value of 0.02 $Kg/head/day$ for this parameter. PP has used the data of Guidelines for National Greenhouse Gas Inventories issued by IPCC in 2006/10/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.9. Fraction of manure handled in baseline animal manure management system j in year y, ID. 9./
MS%_{BI,j,y}, %

Means of verification	The revised PDD/1/ gives the value of 100% for this parameter. PP has used the data of Methane Emission Potential of Poultry Litter (October 2011) issued by Tamil Nadu Agricultural University/40/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.10. CO₂ emission factor of diesel used in the year y, ID. 10./ EF_{CO₂,diesel,y}, tCO₂/TJ

Means of verification	The revised PDD/1/ gives the value of 74.8 tCO ₂ /TJ for this parameter. PP has used the data of Guidelines for National Greenhouse Gas Inventories issued by IPCC in 2006/10/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.11. Net calorific value of diesel, ID. 11./ NCV_{Diesel}, GJ/t

Means of verification	The revised PDD/1/ gives the value of 43.3 GJ/t for this parameter. PP has used the data of Guidelines for National Greenhouse Gas Inventories issued by IPCC in 2006/10/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.12. Density of diesel, ID. 12./ ρ_{diesel},

Means of verification	The revised PDD/1/ gives the value of 0.83 t/m ³ for this parameter. PP has used the data of "CO ₂ Emission Database", version 6 published by the Central Electricity Authority, Ministry of Power, Government of India/39/
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.13. CO₂ emission factor from fuel use due to transportation, ID. 13./ EF_{CO₂,transport}, kgCO₂/km

Means of verification	<p>The revised PDD/1/ gives the value of 0.326 kgCO₂/km for this parameter. PP has calculated the data based on contracts obtained from logistics company assuming an average fuel consumption of 8.25 km/litre.</p> <p>PP has proposed PRC to correct the inputs used in the calculation of this parameter. Though, the final value of the parameter remains the same, the correction makes information consistent within the revised PDD/1/. Please refer to PRC validation report/54/ for the detailed assessment of this change.</p>
Findings	No finding.
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.14. Flare efficiency in hour h based on measurements or default values, ID. 14./ η_{flare,h} = FE_y, %

Means of verification	The revised PDD/1/ gives the value of 90% for this parameter. PP has used the default values from Methodological Tool to determine project emissions from flaring gases containing methane (Version 01)/15/.
Findings	None

Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.
-------------------	---

E.6.1.15. Volumetric fraction of CH₄ in the residual gas in the hour h, ID.15./ $f_{vCH_4, RG, h}$, mg/m³

Means of verification	The revised PDD/1/ gives the value of 60% for this parameter. PP has used the data from Methane Emission Potential of Poultry Litter (October 2011) issued by Tamil Nadu Agricultural University/40/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.16. Average technical transmission and distribution losses for providing electricity to source j in year y, ID. 16./ $TDL_{j,y}$

Means of verification	The revised PDD/1/ gives the value of 20% for this parameter. PP has used the data from methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 01)/41/.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used and reported in MR/2/ and ER calculation/3/.

E.6.1.17. Model correction factor to account for model uncertainties, UF_b

Means of verification	The parameter has not been included in registered PDD and MR, however was used in ER calculation. The registered PDD/1/ gives the value of 0.94 for this parameter under section E.1., on page 34 of the MR in ER calculation. It has been added as an ex-ante value in this monitoring period for clarity purpose. The value does not need validation (and thus PRC) because it is a standard value and also represented in registered PDD in ER calculation description. PP has used the data from methodology AMS.III.D Version 18 which was found to be appropriate and traceable.
Findings	None
Conclusion	The value used for the parameter is found to be correct and justified. The source of information was found to be relevant, credible and traceable. It has been consistently used in the ER calculation/3/.

E.6.2. Data and parameters monitored

E.6.2.1. The gross electricity generated by the project activity, ID. 18./ $EG_{gross,y}$, GWh/y

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is monitored continuously and reported monthly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Monitoring equipment used for monitoring this parameter is a Konzerv-EM 6400 make 0.5s accuracy class energy meter with serial number 205229/270-3310. The above information was verified through onsite visit. Information was found to be consistent.

	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Calibration frequency is once in three years.
	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?	Yes.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of the measuring equipment has been conducted by Yadav Measurement Private Limited/55/ which is a NABL accredited laboratory as verified through directory of accredited testing laboratories issued by NABL on 01/02/2015 /42,53/.
	Is (are) calibration(s) valid for the whole reporting period?	The calibration certificates for the period before August 2018 are not available. The last calibration was done on 18/08/2018 which confirmed that error is within the limit. Since, the parameter is not getting used in the ER calculation, the error factor could not be applied.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Calibration has been carried out for a measuring range comparable with range of measurement.
	How were the values in the monitoring report verified?	The value of 24.601 GWh was verified from monthly reports in logbooks maintained onsite/27/. Value was found to be consistently reported.
	If applicable, has the reported data been cross-checked with other available data?	Gross energy generation data was cross-checked with daily logbook data of import and export of electricity/28/. The values were found to be comparable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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	Not applicable

	as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	None	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.2. Net electricity supplied by the project activity to the grid, ID. 19./EGBL, GWh/y

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is monitored continuously and recorded monthly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Parameter is monitored using a main and a check meter. Both these meters are of Secure make with 0.2 s accuracy. Serial number of main meter is TNE59496 and check meter is TNE59499. The above details has been checked while onsite visit and through calibration certificates for both/20, 21/.
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Calibration frequency is once in five years.
	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?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of both the measuring equipment has been conducted by Yadav Measurement Private Limited/20, 21/ which is a NABL accredited laboratory as verified through directory of

		accredited testing laboratories issued by NABL on 01/02/2015 /42,53/.
	Is (are) calibration(s) valid for the whole reporting period?	<p>Calibration delays:</p> <ol style="list-style-type: none"> 1) The main meter TNE59496 has been calibrated on 30/08/2012 which is valid till 29/08/2017. The next calibration has been conducted on 18/08/2018. Therefore, a delay in calibration from 29/08/2017 to 31/08/2017 during the current monitoring period has been observed. 2) The check meter TNE59499 has been calibrated on 27/08/2012 which is valid till 26/08/2017. The next calibration has been conducted on 18/08/2018. Therefore, a delay in calibration from 26/08/2017 to 31/08/2017 during the current monitoring period has been observed. <p>As per para 366 of VVS for PA, the maximum permissible the error factor of 0.2% has been applied to the parameter for the whole month of July 2017 in the ER sheet ID_R_Elec cell I33/3/ as the result of delayed calibration did not show errors in the measuring equipment.</p> <p>Also, the PP has proposed PRC in the PDD/1/. The registered PDD/1/ requires the calibration to be done every 3 year. However, PP has proposed change in the monitoring plan. The calibration frequency in the revised PDD/1/ is 5 years. The detailed assessment of the change is presented in the PRC validation opinion/54/ submitted with this issuance request. The calibration of both meters is valid for 5 years thus covering the entire reporting period.</p>
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Calibration has been carried out for a measuring range comparable with range of measurement.
	How were the values in the monitoring report verified?	Value of 20.9093 GWh/y was verified from TANGEDCO reports issued monthly/32/. Values were found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	Values were cross-checked from monthly invoices issued by PP to TANGEDCO/29/. Values were found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.

	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
Findings	CAR#06 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.3. Net electricity imported from the grid in case the Power units are not operating, ID. 20./ ECPJ,y, GWh/y

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The monitoring is done continuously and reporting is done monthly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Parameter is monitored using a main and a check meter. Both these meters are of Secure make with 0.2 s accuracy. Serial number of main meter is TNE59496 and check meter is TNE59499. The above details has been checked while onsite visit and through calibration certificates for both/20, 21/.
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Calibration frequency is once in five years.
	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?	Calibration frequency is in line with monitoring plan.

	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of both the measuring equipment has been conducted by Yadav Measurement Private Limited/20, 21/ which is an NABL accredited laboratory as verified through directory of accredited testing laboratories issued by NABL on 01/02/2015 /42,53/.
	Is (are) calibration(s) valid for the whole reporting period?	<p>Calibration delays:</p> <p>1) The main meter TNE59496 has been calibrated on 30/08/2012 which is valid till 29/08/2017. The next calibration has been conducted on 18/08/2018. Therefore, a delay in calibration from 29/08/2017 to 31/08/2017 during the current monitoring period has been observed.</p> <p>2) The check meter TNE59499 has been calibrated on 27/08/2012 which is valid till 26/08/2017. The next calibration has been conducted on 18/08/2018. Therefore, a delay in calibration from 26/08/2017 to 31/08/2017 during the current monitoring period has been observed.</p> <p>As per para 366 of VVS for PA, the maximum permissible the error factor of 0.2% has been applied to the parameter for the whole month of July 2017 in the ER sheet ID_R_Elec cell I33 as the result of delayed calibration did not show errors in the measuring equipment.</p> <p>Also, the PP has proposed PRC in the PDD/1/. The registered PDD/1/ requires the calibration to be done every 3 year. However, PP has proposed change in the monitoring plan. The calibration frequency in the revised PDD/1/ is 5 years. The detailed assessment of the change is presented in the PRC validation opinion/54/ submitted with this issuance request. The calibration of both meters is valid for 5 years thus covering the entire reporting period.</p>
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Calibration has been carried out for a measuring range comparable with range of measurement.
	How were the values in the monitoring report verified?	Value of 0.02824 GWh was verified from TANGEDCO reports issued monthly/32/. Values were found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	Values were cross-checked from monthly invoices issued by PP to TANGEDCO/29/ and monthly import details/31/. Values were found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and	Data management and QA/QC procedures were found to be appropriate.

	are necessary QA/QC processes in place?	
	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
Findings	None.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.4. Amount of waste type *i* (poultry litter, agricultural wastes, cow dung) used at the plant, ID. 21./ $Q_{i,y}$, t/y

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Each truck loading is monitored and reported monthly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	<p>Parameter is monitored weighbridge of Ricelake Weighing Systems with an accuracy class of +/- 0.025%. There were two weight bridges (serial numbers RH 1151 and RH 1152) were in use until 28/09/2016. However, from 29/09/2016, PP stopped using the weight bridge SN RH1152 because of extra cost of maintenance and one weight bridge was found sufficient for the requirement.</p> <p>All the above details were found consistent onsite and with calibration certificates/23/</p>
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Once in three years

	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?	Calibration interval is in line with the monitoring plan/1/ and methodology/5,6/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of both weighbridges has been conducted by government of Tamil Nadu/23/
	Is (are) calibration(s) valid for the whole reporting period?	Last Calibration was conducted on <ul style="list-style-type: none"> 22/08/2013 for both weighbridges 26/08/2015 for both weighbridges The details were verified through calibration certificates and found okay/23/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	Values as reported in ER sheet for different periods has been checked with weighbridge records maintained onsite/35/.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	None	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.5. Amount of treated residue (compost) shipped off, ID. 22./Qres waste,y, t/y

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Each truck is monitored and monthly reported.

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	<p>Parameter is monitored using weighbridge of Ricelake Weighing Systems with an accuracy class of $\pm 0.025\%$. There were two weight bridges (serial numbers RH 1151 and RH 1152) which were in use until 28/09/2016. However, from 29/09/2016, PP stopped using the weight bridge SN RH1152 because of extra cost of maintenance and because one weight bridge was found sufficient for the requirement.</p> <p>Every time the compost is going out (shipped off) the weighbridge operator records the values in the system (xls) and generate the 'Weighment slip for customer' which includes the total weight of the compost shipped off and name of the consumer. This slip gets approved by the shift engineer every time/34/.</p> <p>All the above details were found consistent onsite and with calibration certificates/23/</p>
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Once in every three years.
	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?	Calibration interval is in line with the monitoring plan/1/ and methodology/5,6/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of both weighbridges has been conducted by government of Tamil Nadu/23/
	Is (are) calibration(s) valid for the whole reporting period?	<p>Last Calibration was conducted on</p> <ul style="list-style-type: none"> • 22/08/2013 for both weighbridges • 26/08/2015 for both weighbridges <p>The details were verified through calibration certificates and found okay/23/.</p>

	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	Values as reported in ER sheet/3/ for different periods has been checked with weighbridge records maintained onsite/35/.
	If applicable, has the reported data been cross-checked with other available data?	The reported values were cross-checked with invoices generated for export of fertilizer/33/. The values were found to be comparable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	None	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan/1/. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.6. Methane content in the biogas (dry), ID.23./ wCH₄, %

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Parameter is monitored continuously, recorded every half hourly and reported monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Parameter is monitored using a gas analyser of Union Instruments GmbH, INCA4001 T100-02 make, +/- 1% accuracy class and serial number 94116. The details were verified by calibration certificate/18/ and onsite visit. Information was consistently reported.
	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?	Accuracy is as stated in monitoring plan.

	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for entire measuring range.
	Calibration frequency /interval:	Once in three years
	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?	Calibration interval is in line with the monitoring plan and methodology.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration has been conducted by Union instruments GmbH which is also the manufacturer of same equipment/18/
	Is (are) calibration(s) valid for the whole reporting period?	Calibration was conducted on 25/09/2012 and valid till 24/09/2015. The next calibration was due on 24/09/2015 but was conducted on 21/09/2016 and valid for next three years. A gap in calibration of methane analyser was observed from 24/09/2015 to 21/09/2016. Due to late calibration of the gas meter the maximum permissible error of +1% has been applied to parameter ID.23 in periods without valid calibration 24/09/2015 to 21/09/2016. The details of calibration was verified from the calibration certificates/18/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	Values reported in ER sheet has been verified from gas analyser log data maintained onsite/43/. Values were found to be consistently reported. PP has sought temporary deviation for the period when the PP was unable to monitor this parameter. Please refer to section E.4. for details.
	If applicable, has the reported data been cross-checked with other available data?	Reported data has been cross-checked with monthly reports maintained onsite/43/. Values were found to be consistently reported.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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?	Yes. Please refer to section E.4. for details.
Findings	CAR#09 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that :	

	<ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan/1/. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 366 of VVS for PA Version 02/9/. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity.
--	--

E.6.2.7. Volumetric flow rate of the residual gas in dry basis at normal conditions in hour h , ID. 24./FVRG,h, m³/h

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Measured continuously, recorded every 10 minutes and reported monthly. The set frequency half hourly for recording. Since the PP has recorded the values with a greater frequency, the value was found acceptable.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	The parameter is monitored with the help of an Endress + Hauser make thermal mass flow meter of accuracy class +/-1.8% of reading +0.1% full scale. Serial number of equipment is HA0 3CE02000. The specifications of equipment were concluded consistent with the help of onsite visit and calibration certificate/19/.
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Once in three years
	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?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration has been carried out by the manufacturer of the meter itself as verified by calibration certificate/19/.

	Is (are) calibration(s) valid for the whole reporting period?	<p>Calibration was conducted on 30/10/2013 which is valid till 30/10/2016</p> <p>Next calibration was done on 17/01/2017 and 08/02/2018.</p> <p>Delay between period 30/10/2016-17/01/2017 was observed. PP has applied delay calibration factor for the parameter during the delay period.</p> <p>The calibration certificate was used to verify the dates/19/.</p>
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	<p>Values as reported in ER sheet were verified using half hourly reported data in log books maintained onsite/44/.</p> <p>The PP has not monitored the parameter for certain period and sought temporary deviation for it.</p> <p>The period not monitored has been highlighted yellow in the worksheet titled "ID 23,24,25,26,29 PE_Flare 2017" and "ID 23,24,25,26,29 PE_Flare 2016" of the ER sheet/3/.</p> <p>The values of the parameter ID. 24./FVRG,h, were not recorded as per the set frequency. <u>Calculation of ERs through first method:</u> The parameters ID. 24./FVRG,h, is directly used in calculation of $PE_{flaring,y}$ and $PE_{phy,Leakage,y}$ as can be seen the work sheet titled 'PE-IIIIO', column G and column H in the ER sheet/3/. The baseline emissions are calculated based on the amount of poultry waste used. This is the first calculation method and the second method is described below. Thus, these parameters contribute only to project emissions and not baseline emissions.</p> <p>Though the parameters were not monitored, the plant was still working. Thus, the project emissions occurred during the period of no monitoring cannot be ignored.</p> <p>The period for which temporary deviation has been sought, the PP has proposed to apply the maximum values of flow rate ever monitored since the start of the crediting period, as an alternative approach.</p> <p>The maximum values of flow rate monitored between the period 01/08/2015 to 31/08/2017(i.e. current monitoring period) were as following:</p> <p>1120 m³/hr for flow rate of gas sent to as checked from column C of the worksheets - "ID 23,24,25,26,29 PE_Flare 2015" , "ID 23,24,25,26,29 PE_Flare 2016" and "ID</p>

		<p>23,24,25,26,29 PE_Flare 2017", ER sheet/3/ and ER sheet of the previous monitoring period/56/.</p> <p>The period not monitored are: 01/05/2016-18/08/2016² 15/12/2016-20/04/2017</p> <p>The period with delay in calibration is: 30/10/2016-16/01/2017</p> <p>PP has also applied the error factor (1.8%) to maximum values identified (1120 m³/hr for flow rate of gas sent to flame) as per the results of next calibration certificate. The next calibration certificate/19/ were checked to confirm that the meters are rendering the values within the permissible limit and applied error factor is correct and justified.</p> <p>The final value obtained after applying the error factor to identified maximum values are 1140.16 m³/hr for flow rate of gas sent to flame. This value is consistently applied in the ER sheet/3/ for the period when no monitoring was done.</p> <p>The highest obtained values have not been achieved during actual monitoring. Thus, applying these highest values throughout the period not monitored was found conservative as compared to period when the monitoring is done. It is can be clearly seen in the work sheet titled 'PE-IIIAO' , column G and column H in the ER sheet/3/, that the values for not monitored period are unrealistically higher as compared to the other months when regular monitoring has been done.</p> <p>Thus, the PP has applied a conservative approach to account for the project emission from flaring for this period.</p> <p>Please refer to PRC validation report/54/ for details.</p>
	If applicable, has the reported data been cross-checked with other available data?	Data was cross-checked with monthly reported gas flow meter readings. Values were found to be consistent/44/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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	Yes. Please refer to section E.4. for details.

² The exact period is 01 August 2016 12:10 and 12 August 2016 11:10 to 18 August 2016 11:30 am, but the for the ease of calculation the deviation has been sought for the entire period between 01/05/2016 to 18/08/2016

	as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	CAR#10 was raised and resolved.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan/1/. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 366 of VVS for PA Version 02/9/. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.8. The amount of the biogas combusted, measured on a dry basis, ID.25./ BGcombusted,y, m³/y (normalized)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	<p>Measured continuously, recorded every ten minutes and reported monthly and yearly.</p> <p>The set frequency half hourly for recording. Since the PP has recorded the values with a greater frequency, the value were found acceptable</p>
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Parameter is monitored using a flow meter of Endress + Hause make with serial number HAO 3CF02000 and accuracy class +-0.1%. This has been verified using calibration certificate/45/ and onsite visit. Information was found to be consistent.
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Once in three years
	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	Yes

	frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration has been carried out by the manufacturer of equipment itself as verified through calibration certificate/45/.
	Is (are) calibration(s) valid for the whole reporting period?	Calibration was conducted on 30/10/2013 which is valid till 30/10/2016 Next calibration was done on 17/07/2017 and 20/06/2018. Delay between period 30/10/2016-16/07/2017 was observed. Error factor has been applied in the delayed period. The calibration certificate was used to verify the dates/45/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	<p>Reported values as per ER sheet were verified through reading logbooks maintained onsite/46/.</p> <p>The PP has not monitored the parameter for certain period and sought temporary deviation for it.</p> <p>The values of the parameter, ID.25./Bgcombusted,y was also not recorded as per the set frequency.</p> <p><u>Calculation of Ers through first method:</u></p> <p>The parameters ID.25./Bgcombusted,y is directly used in calculation of PE_{flaring,y} and PE_{phy,Leakage,y}, as can be seen the work sheet titled 'PE-IIIAO', column G and column H in the ER sheet/3/. The baseline emissions are calculated based on the amount of poultry waste used. This is the first calculation method and the second method is described below. Thus, these parameters contribute only to project emissions and not baseline emissions.</p> <p>Though the parameters were not monitored, the plant was still working. Thus, the project emissions occurred during the period of no monitoring cannot be ignored.</p> <p>The period for which temporary deviation has been sought, the PP has proposed to apply the maximum values of flow rate ever monitored since the start of the crediting period, as an alternative approach.</p> <p>The maximum value of flow rate monitored between the period 01/08/2015 to 31/08/2017(i.e. current monitoring period) is as following:</p> <p>1175.95m³/hr for flow rate of gas sent to CHP as checked from column C and D of the worksheets – "ID 23,24,25,26,29 PE_Flare 2015" , "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017", ER sheet/3/ and ER sheet of the previous monitoring period/56/.</p>

		<p>The period not monitored are: 01/05/2016-18/08/2016³ 15/12/2016-20/04/2017</p> <p>The period with delay in calibration is: 30/10/2016-16/07/2017(for HAO3CF02000)</p> <p>PP has also applied the error factor (1.0%) to maximum value identified (1175.95m³/hr for flow rate of gas sent to CHP) as per the results of next calibration certificate. The next calibration certificates/45/ were checked to confirm that the meters are rendering the values within the permissible limit and applied error factor is correct and justified.</p> <p>The final value obtained after applying both the error factor to identified maximum value is 1187.71 m³/hr for flow rate of gas sent to CHP. These values are consistently applied in the ER sheet/3/ for the period when no monitoring was done.</p> <p>The highest obtained values have not been achieved during actual monitoring. Thus, applying these highest values throughout the period not monitored was found conservative as compared to period when the monitoring is done. It is can be clearly seen in the work sheet titled 'PE-IIIAO' , column G and column H in the ER sheet/3/, that the values for not monitored period are unrealistically higher as compared to the other months when regular monitoring has been done.</p> <p>Thus, the PP has applied a conservative approach to account for the project emission from flaring for this period.</p> <p>Please refer to PRC validation report/54/ for details.</p>
	If applicable, has the reported data been cross-checked with other available data?	Reported data as cross-checked with monthly report generated/46/. Information was found to be consistently reported.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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?	Yes. Please refer to section E.4. for details.

³ The exact period is 01 August 2016 12:10 and 12 August 2016 11:10 to 18 August 2016 11:30 am, but the for the ease of calculation the deviation has been sought for the entire period between 01/05/2016 to 18/08/2016

Findings	CAR#4 and CAR#9 were raised and resolved. Refer to appendix 4 for details.
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan/1/. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 366 of VVS for PA Version 02/9/. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity.

E.6.2.9. The amount of biogas generated that is flared, measured on a dry basis, ID.26./ Bgflared,y, m³/y (normalized)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Measured continuously, recorded half hourly and reported monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	The parameter is monitored with the help of a Endress + Hause make thermal mass flow meter of accuracy class +/-1.8% of reading +0.1% full scale. Serial number of equipment is HAO 3CE02000. The specifications of equipment were concluded consistent with the help of onsite visit and calibration certificate/19/.
	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?	The accuracy of the equipment is as per the monitoring plan.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Once in three years
	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?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration has been carried out by the manufacturer of equipment itself as verified through calibration certificate/19/.
	Is (are) calibration(s) valid for the whole reporting period?	Calibration was conducted on 30/10/2013 which is valid till 30/10/2016

		<p>Next calibration was done on 17/01/2017 which is valid till 16/01/2020.</p> <p>Delay between period 30/10/2016-17/01/2017 was observed. PP has applied delay in calibration factor for the delayed period.</p> <p>The calibration certificate was used to verify the dates/19/.</p>
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	<p>Values as reported in ER sheet were verified using half hourly reported data in log books maintained onsite/47/.</p> <p>The PP has not monitored the parameter for certain period and sought temporary deviation for it.</p> <p>The period not monitored has been highlighted yellow in the worksheet titled "ID 23,24,25,26,29 PE_Flare 2017" and "ID 23,24,25,26,29 PE_Flare 2016" of the ER sheet/3/.</p> <p>The values of the parameter ID. ID.26./Bgflared,y, were not recorded as per the set frequency.</p> <p><u>Calculation of Ers through first method:</u></p> <p>The parameters ID.26./Bgflared,y is directly used in calculation of PE_{flaring,y} and PE_{phy,Leakage,y}, as can be seen the work sheet titled 'PE-III AO', column G and column H in the ER sheet/3/. The baseline emissions are calculated based on the amount of poultry waste used. This is the first calculation method and the second method is described below. Thus, these parameters contribute only to project emissions and not baseline emissions.</p> <p>Though the parameters were not monitored, the plant was still working. Thus, the project emissions occurred during the period of no monitoring cannot be ignored.</p> <p>The period for which temporary deviation has been sought, the PP has proposed to apply the maximum values of flow rate ever monitored since the start of the crediting period, as an alternative approach.</p> <p>The maximum value of flow rate monitored between the period 01/08/2015 to 31/08/2017 (i.e. current monitoring period) is as following:</p> <p>1120 m³/hr for flow rate of gas sent to as checked from column C of the worksheets – "ID 23,24,25,26,29 PE_Flare 2015", "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017", ER sheet/3/ and ER sheet of the previous monitoring period/56/.</p>

		<p>The period not monitored are: 01/05/2016-18/08/2016⁴ 15/12/2016-20/04/2017</p> <p>The period with delay in calibration is: 30/10/2016-16/01/2017</p> <p>PP has also applied the error factor (1.8%) to maximum value identified (1120 m³/hr for flow rate of gas sent to flame) as per the results of next calibration certificate. The next calibration certificate/19/ were checked to confirm that the meters are reading the values within the permissible limit and applied error factor is correct and justified.</p> <p>The final value obtained after applying the error factor to identified maximum values are 1140.16 m³/hr for flow rate of gas sent to flame. This value is consistently applied in the ER sheet/3/ for the period when no monitoring was done.</p> <p>The highest obtained values have not been achieved during actual monitoring. Thus, applying these highest values throughout the period not monitored was found conservative as compared to period when the monitoring is done. It can be clearly seen in the work sheet titled 'PE-IIIAO', column G and column H in the ER sheet/3/, that the values for not monitored period are unrealistically higher as compared to the other months when regular monitoring has been done.</p> <p>Thus, the PP has applied a conservative approach to account for the project emission from flaring for this period.</p> <p>Please refer to PRC validation report/54/ for details.</p>
	If applicable, has the reported data been cross-checked with other available data?	Data was cross-checked with monthly reported gas flow meter readings. Values were found to be consistent/47/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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?	Yes. Please refer to section E.4. for details.
Findings	CAR#9 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that :	

⁴ The exact period is 01 August 2016 12:10 and 12 August 2016 11:10 to 18 August 2016 11:30 am, but the for the ease of calculation the deviation has been sought for the entire period between 01/05/2016 to 18/08/2016

	<ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and revised monitoring plan/1/. Where there is a gap in calibration, an appropriate error factor has been applied inline to para 366 of VVS for PA Version 02/9/. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity.
--	--

E.6.2.10. Number of times each batch is tilled, ID. 27./ Frequency of tilling, Number

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	It is monitored and reported daily
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Not applicable
	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
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Values reported in ER sheet has been verified using the tilling records maintained onsite/38/. Values were found to be consistent.

	If applicable, has the reported data been cross-checked with other available data?	Not applicable
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	CAR#11 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> • The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and monitoring plan/1/. • Monitoring results are consistently recorded as per approved frequency • QA/QC procedures have been applied in accordance with the registered monitoring plan. • No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.11. Amount of diesel consumption for operation at site for e.g. tillers and diesel generator set, ID. 28./FC_{Diesel}, Litres

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Monitored daily and reported monthly
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	The values are recorded in the 'Diesel Log Book' by the Shift In-charge on daily basis. The values are then transferred into the daily report which is approved by Plant Manager. The stock is closed on monthly basis.
	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
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	Calibration frequency /interval:	Not applicable
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan	Not applicable

	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?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Value of parameter was verified using diesel consumption records/48/ maintained onsite. Values were found to be consistently reported.
	If applicable, has the reported data been cross-checked with other available data?	Reported value was cross-checked using invoices received by PP for diesel purchase/24/. The invoices are being generated every 15 days by the supplier based on the 'intent to purchase' approved by Plant Manager. All these invoices are recorded. Values were found to be comparable. There was no other diesel consuming equipment found onsite.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	None	
Conclusion	<p>Through onsite audit and assessment of documents DOE can conclude that :</p> <ul style="list-style-type: none"> The equipment used for monitoring of parameter is calibrated by the PP at a frequency specified in the applied monitoring methodology and monitoring plan/1/. Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.12. Temperature in the exhaust gas of the flare, ID. 29./ T_{flare} , Deg C

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Monitored continuously, recorded half hourly and reported monthly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes

	Monitoring equipment	<p>The parameter is monitored using 4 Tempsens make thermocouple with an accuracy class of +/- 0.5% and serial numbers 10-TC-80322, 10-TC-80323, 10-TC-80324, 10-TC-80325. The above details were found to be consistent with calibration certificates/22/ and onsite observation of assessment team.</p> <ul style="list-style-type: none"> • Calibration done on 17/01/2017 valid until 16/01/2018 (For all four) • Calibration done on 31/12/2015 valid until 31/12/2016 (For all four) • Calibration done on 05/06/2014 valid until 04/06/2015 (For all four). <p>Thermocouple was not found in calibration from the period starting from 05/06/2015 to 31/12/2015 & 01/01/2017 to 17/01/2017. Due to late calibration of the thermocouples the maximum error of -2.2 °C has been applied to parameter</p>
	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?	The accuracy of the equipment is as per the monitoring plan/1/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	Annual
	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?	Yes
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration was conducted by Hi Tech Calibration Services/22/ which is an NABL accredited company as verified through list of NABL accredited testing laboratories issues by NABL in 2015/42/.
	Is (are) calibration(s) valid for the whole reporting period?	<ul style="list-style-type: none"> • Calibration done on 17/01/2017 valid until 16/01/2018 (For all four) • Calibration done on 31/12/2015 valid until 31/12/2016 (For all four) • Calibration done on 05/06/2014 valid until 04/06/2015 (For all four).

		Thermocouple was not found in calibration from the period starting from 05/06/2015 to 31/12/2015 & 01/01/2017 to 17/01/2017. Due to late calibration of the thermocouples the maximum error of -2.2 °C has been applied to parameter
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes
	How were the values in the monitoring report verified?	Values as reported in ER sheet has been verified using plant records of half hourly reading of temperature in exhaust gas of flare /49/. Values were found to be consistently reported.
	If applicable, has the reported data been cross-checked with other available data?	Reported data was cross-checked with monthly generated reports maintained on site/49/. Values were found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	CAR#15 was raised and resolved.	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. No sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.13. Livestock population, ID. 30./ $N_{LT,y}$, Individual bird

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	It is calculated and annually recorded
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Not applicable
	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	Not applicable

	local/national standards, or as per the manufacturer's specification?	
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	The calculation done and input values as reported in ER sheet has been verified using the source of information i.e. report from Tamil Nadu Agricultural University/40/. Values were found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	The value of incoming chicken litter which were used for calculation of this parameter has been checked with weighbridge slips/35/. Values were found to be comparable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	None	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. 	

- No sampling approach has been followed for monitoring which is appropriate for the project activity.

E.6.2.14. Average incremental distance for waste type *i* (poultry litter, agri waste and cow dung) transportation, ID. 31/DAF_{w,i}, km/truck

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Monitored and recorded on each truck basis. Values are sampled for calculation purpose for this parameter in the monitoring period inline to annex 4 of revised PDD/1/. Number of samples as represented in ER sheet were found to be as per the validated numbers. Justification of sample size has been given in ER calculation sheet along with the demonstration of how it is meeting the precision and accuracy set in registered monitoring plan (90/10). The explanation was found to be legit and statistically sound.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Every truck is carrying the weighment slip from the supplier which has got the address of the supplier mentioned in it. Then weighbridge operator looking at the reference sheet record the distance travel by the truck in the soft copies. The values are then recorded in daily sheet. The recorded values against all trucks for the distance travelled and place of the origin of waste was verified from the daily record and found okay.
	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
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable

	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Sampled values recorded in ER sheet/3/ has been verified from weighbridge slips for import of waste/35/ which consisted information regarding type and source of waste coming in. Values were found to be consistently reported.
	If applicable, has the reported data been cross-checked with other available data?	The given values were checked using independent sources such as Google maps/51/ (maps.google.com). Values were found to be comparable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	CAR#08 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. Sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.15. Average incremental distance for compost transportation, ID. 32./ DAF_{res} waste, km/truck

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Reported on each truck basis. Sampling approach is followed for this parameter inline to annex 4 of revised PDD/1/. Validated value for sample size is 13 which is also the number of samples taken to determine this parameter. Justification of sample size has been given in ER calculation sheet along with the demonstration of how it is meeting the precision and accuracy set in registered monitoring plan (90/10). The explanation was found to be legit and statistically sound.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Every truck shipping off the compost from the plant carry a weighment slip for the supplier. The weighbridge operator records the quantity of

		compost and the distance this truck is going to travel because the address of the consumer is also mentioned on the weighment slip. Looking at the reference sheet record the operator records the distance to be travelled by the truck in the soft copies. The values are then recorded in daily sheet. The recorded values against all trucks for the distance travelled and place of the origin of waste was verified from the daily record and found okay.
	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
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	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 Not applicable of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Sampled values as reported in ER sheet/3/ were verified using weighbridge slips for exported fertilizer/34/ which consisted of information about destination of material. Values were found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	Reported values were cross-checked using invoice generated for exported fertilizer/33/. Values were found to be comparable.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.

	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
Findings	None	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. Sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.2.16. Proper application of compost, ID. 33./ APPcomp, %-age

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Sampled on each truck basis. Justification of sample size has been given in ER calculation sheet along with the demonstration of how it is meeting the precision and accuracy set in registered monitoring plan (90/10). The explanation was found to be legitimate and statistically sound.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
	Monitoring equipment	Not applicable as this is a sampling survey conducted by third party.
	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
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	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?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable

	Is (are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	Value as reported in ER sheet has been verified using the farmer's feedback record/26/ as recorded during third party survey. The information concluded in the survey is that organic compost generated has been used by farmers to grow various varieties of crops including tobacco, turmeric, maize, coconut etc. Farmers were of an opinion that compost increased yield of soil. The validated sample size of 20 hectares was also maintained.
	If applicable, has the reported data been cross-checked with other available data?	The reported data was cross-checked with invoices generated while exporting the fertilizer/33/. It was evident that compost has been transported to farmers in nearby area.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Data management and QA/QC procedures were found to be appropriate.
	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
Findings	None	
Conclusion	Through onsite audit and assessment of documents DOE can conclude that : <ul style="list-style-type: none"> Monitoring results are consistently recorded as per approved frequency QA/QC procedures have been applied in accordance with the registered monitoring plan. Sampling approach has been followed for monitoring which is appropriate for the project activity. 	

E.6.3. Implementation of sampling plan

Means of verification	Sampling plan has been applied in accordance with standard for sampling and surveys for CDM project activities and programme of activities (Version 2.0). Sampling has been conducted for three parameters, i.e. $DAF_{w,l}$, $DAF_{res\ waste}$ and APP_{comp} . Sampling method used for $DAF_{w,l}$ is stratified random and simple random sampling has been done for other two parameters. Sample size has been determined using 90/10 confidence margin. As per registered PDD/1/, sample size has been decided on the basis of total population. Sample size has been determined appropriately for all three parameters and inline to plan set in PDD/1/. It has also been elaborated in excel sheet that how sample size is meeting the precision criteria.
Findings	CAR#02 was raised and resolved. Refer to appendix 4 for details.
Conclusion	The verification team confirms that the sampling plan and the parameter values are in accordance with the monitoring plan provided in PDD /01/. Sample size calculation and precision criteria was found to be inline with revised PDD/1/.

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

Means of verification	The calibration details of the monitoring equipment are as follows:
------------------------------	---

	Equipment	Serial number	Calibration date	Calibration valid till	MP covered?
	Weigh Bridge	RH 1151	22/08/2013 26/08/2015	21/08/2016 25/08/2018	Y
	Weigh Bridge	RH 1152	22/08/2013 26/08/2015	21/08/2016 25/08/2018	Y
	Gas Analyzer	94116	25/09/2012 21/09/2016	24/09/2015 20/09/2019	N (PP has applied the maximum permissible error of +1.0% to the delayed period)
	Thermal Mass Flow Meter	HAO 3CE02000	30/10/2013 17/01/2017 08/02/2018	29/10/2016 16/01/2020 07/02/2021	N (Error factor 1.8% has been applied for the delay period.) As per the calibration certificate/19/ of the flow meter (HAO 3CE02000) dated 17/01/2017, the error was found to be within the limit. Thus, as per para 366(a) the PP shall apply maximum permission error of the instrument (0.1% as per manufacturer's specification of the meter). As a conservative approach PP has proposed to apply a more conservative error factor +-1.8%. The factor has been consistently applied in the MR and ER sheet.
	Flow Meter	HAO 3CF02000	31/10/2013 17/07/2017 20/06/2018	30/10/2016 17/07/2018 19/06/2019	N (Error factor +/- 1.0% has been applied for the delay period.) As per the calibration certificate/45/ of the flow meter (HAO 3CF2000) dated 17/07/2017, the error was found to be within the limit. Thus, as per para 366(a) the PP shall apply maximum permission error of the instrument (0.1% as per manufacturer's specification of the meter) for the period from 30/10/2016 to 16/07/2017. However, PP has voluntarily

					proposed to apply a more conservative error factor +/-1%. The factor has been consistently applied in ER sheet and also reported the details of next calibration in MR
	Thermocouple	10-TC-80322, 10-TC-80323, 10-TC-80324, 10-TC-80325	05/06/2014, 31/12/2015, 17/01/2017	04/06/2015 31/12/2016 16/01/2018	N (the PP has applied maximum error of -2.2 °C to parameter ID.29 for periods without valid calibration (05/06/2015 to 30/12/2015 and 01/01/2017 to 17/01/2017))
	Main meter for Electricity generation	TNE59496	30/08/2012 18/08/2018	29/08/2017 17/08/2023	N (Error factor +/- 0.2% has been applied for the delay period.)
	Check meter for electricity generation	TNE59499	a27/08/2012	26/08/2017	N (Error factor +/- 0.2% has been applied for the delay period.)
	Gross Energy generated	205229/270-3310	18/08/2018	17/08/2021	N (but since the parameter is not used in ER calculation, the error factor is not applied)
	<p>The verification team checked all the calibration certificates/18-23, 45/ to confirm the dates mentioned in the above table.</p> <p>The PP has applied error factor to the delayed period as per para 366 of VVS for PA version 2.0/9/. The ER sheet/3/ was checked to confirm that the error factors have been applied correctly.</p>				
Findings	CAR#07 and CAR#13 were raised and resolved. Refer to appendix 4 for details.				
Conclusion	Meters are duly calibrated before the expiry. However, wherever the calibration frequency has not been followed, the period has been marked as delay. It is noteworthy that the delay in the calibration of meters occurred in the current monitoring period is appropriately addressed in line with para 366 of VVS for PA Version 02.				

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

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

Means of verification	<p>There are two types of baseline emissions in the project activity calculates in accordance with two applied methodologies, i.e. AMS.I.D Ver. 17 and AMS.III.AO Ver. 01/5,6/:</p> <ol style="list-style-type: none"> 1. Baseline emission from electricity generation which is calculated using the following formula: $BE_{Elec,y} = EG_{BL,y} * EF_{CO2,grid,y}$ Where: $EG_{BL,y}$ is Net electricity supplied by the project activity to the grid And $EF_{CO2,grid,y}$ is emission factor fixed ex-ante as 865 tCO₂/GWh 2. Baseline emission from poultry litter $BE_{manure,y} = GWP_{CH4} * D_{CH4} * UF_b * \sum_j LT MCF_j * B_{0,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{BI,J}$ Where: 	
	Variable	Description

	GWpch4	Global Warming Potential of methane
	DCH4	Density of methane at normal conditions
	Ufb	Model correction factor to account for model Uncertainties
	MCFj	Methane conversion factor for manure management.
	LT	Index for all types of livestock
	j	Index for animal manure management system
	B0, LT	Maximum methane production potential
	NLT,y	Livestock population
	VSLT,y	Volatile solids for Chicken litter produced per head
	MS%BI,u	Fraction of manure handled in baseline animal manure management system j in year y
<p>All the data was available as per required monitoring frequency.</p> <p>The baseline emissions are calculated as per provisions indicated in the registered PDD/1/ and applied methodology/5,6/. The means of verification for the parameter are described under section E.6.2.</p> <p>Please note, the net electricity considered for baseline emission is electricity exported by the project activity. This was accepted by the assessment team since the project applies AMS I.D and AMS III AO and the later methodology requires the PP to evaluate project emissions from the power consumed. In the project setup the state authority issues a combined statement which includes the electricity exported by the project activity and power imported by the project. Hence the PP has evaluated baseline emissions considering the energy exported based on the statements which also form the basis of monetary transactions. And the energy imported is considered under project emissions as required by AMS III AO. This was accepted as a conservative approach as along with the energy imported it also discounts the distribution and transmission losses (20%). Therefore, the team is of the opinion that the approach would result in overall conservative total emission reductions.</p>		
Findings	CAR#01 was raised and resolved. Refer to appendix 4 for details.	
Conclusion	<p>Calculation of baseline GHG emissions was found to be satisfactory.</p> <p>The verification team confirms that</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the registered PDD, with the invoices /29/ and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(e) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>	

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

Means of verification	<p>Project emissions have been calculated using the following formula:</p> $PE_y = \left\{ PE_{transp,y} + PE_{power,y} + PE_{res waste,y} + PE_{phy leakage,y} + PE_{flaring,y} \right\}$
------------------------------	--

	<p>Project emission due to residual waste is not considered since residual waste from digestion is not stored anaerobically or sent to landfill. Thus $PE_{res,waste,y}$ is considered as 0 which is appropriate as per registered PDD/1/.</p> <p>$PE_{phy,leakage,y}$ has been calculated as "Total Biogas production*Methane*0.05*GWP of methane". The value of 0.05 is a default factor validated in registered PDD for m³ of biogas leaked/m³ biogas produced.</p> <p>Formula applied for $PE_{trans,p}$, $PE_{power,y}$ and $PE_{flaring,y}$ were checked and found consistent with the PDD/1/ and the applied methodology/5,6/.</p> <p>All the data were available as per required monitoring frequency.</p> <p>The project emissions are calculated as per provisions indicated in the registered PDD/1/ and applied methodology/5,6/. The means of verification for the parameter are described under section E.6.2.</p>
Findings	CAR#12 was raised and resolved.
Conclusion	<p>Calculation of project GHG emissions was found to be satisfactory.</p> <p>The verification team confirms that:</p> <p>(a) The monitored data was available in accordance with the registered monitoring plan;</p> <p>(b) The monthly reported data was cross-checked, as prescribed in the registered PDD, with the invoices /29/ and was found consistent;</p> <p>(c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals have been followed;</p> <p>(d) The assumptions, emission factors and default values that were applied in the calculations have been justified;</p> <p>(f) The first day in which CERs are being claimed has been correctly specified, where applicable.</p>

E.8.3. Calculation of leakage GHG emissions

Means of verification	As per methodology and registered PDD, leakages have been counted as zero.
Findings	None
Conclusion	No leakages are applicable to the project activity.

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

Means of verification	<p>As per the applied methodology the emission reduction will be the lowest of the following:</p> <ol style="list-style-type: none"> 1- Method 1: Ex post calculated baseline, project and leakage emissions based on actual monitored data for the project activity 2- Method 2: The amount of biogas recovered and fuelled or flared (MDy) during the crediting period, that is monitored ex post; <p>The emission reduction achieved will be:</p> $ER_{y,ex\ post} = \min \left[\frac{(BE_{y,ex\ post} - PE_{y,ex\ post} - LE_{y,ex\ post}), (MD_y - PE_{y,power,ex\ post} - PE_{y,transp,ex\ post} - PE_{y,res\ waste,ex\ post} - PE_{y,phy\ leakage,ex\ post} - LE_{y,ex\ post})}{PE_{y,transp,ex\ post} - PE_{y,res\ waste,ex\ post} - PE_{y,phy\ leakage,ex\ post} - LE_{y,ex\ post}} \right]$ <p>Where:</p> <p>$ER_{y,ex\ post}$ = Emission reductions achieved by the project activity based on monitored values for year y (t CO₂e)</p> <p>$BE_{y,ex\ post}$ = Baseline emissions calculated using equation 6 using ex post monitored values (e.g. Q_y) (tCO₂e)</p> <p>$PE_{y,ex\ post}$ = Project emissions calculated using ex post monitored values (e.g. Q_y, transport distances, the amount of electricity/fossil fuels used, emissions from anaerobic storage). This</p>
------------------------------	---

	calculation shall include project emissions from physical leakage (tCO ₂ e)
LE _{y,ex post}	= Leakage emissions calculated using ex post monitored values (tCO ₂ e)
MD _y	= Methane captured and destroyed or used gainfully by the project activity in year y (tCO ₂ e)
PE _{y,transp,ex post}	Emissions from incremental transportation based on monitored values in the year y (tCO ₂ e)
PE _{y, power,ex post}	= Emissions from the use of fossil fuel or electricity for the operation of the installed facilities based on monitored values in the year y (tCO ₂ e)
PE _{y,res waste,expost}	= Methane emissions from the anaerobic decay/treatment of the residual waste/products based on monitored values in the year y (tCO ₂ e)
PE _{y,phyleakage,expost}	Methane emissions from physical leakages of the anaerobic digester based on monitored values in year y (tCO ₂ e)

PP has calculated the emission reduction from both the options and selected the lowest one for claiming the ERs. The details of both the options is as follows:

Method 1 is described in detail under section E.8.1 and E.8.2. of this report. The total ERs calculated through method 1 is 19,193 tCO₂e.

Method 2:

PP has calculated the methane captured and destroyed/gainfully used by the project activity as per the para 19(b) of applied methodology AMS.III.AO version 1.0 from the following equation:

$$MD_y = BG_{burnt,y} \times w_{CH_4,y} \times D_{CH_4} \times FE \times GWP_{CH_4}$$

Where:

$BG_{burnt,y}$	= Biogas flared/combusted in year y (m3)
$w_{CH_4,y}$	= Methane content of the biogas in the year y (Volume fraction)
D_{CH_4}	= Density of methane at the normal conditions (20°C at 1 atmosphere) (t/m3)
FE	= Flare efficiency in year y (fraction). If the biogas is combusted for gainful purposes.

A portion of the biogas is destroyed through flaring and another portion is used for energy generation.

Hence:

$$BG_{burnt,y} = BG_{combusted,y} + BG_{flared,y}$$

Where:

$BG_{combusted,y}$	= Biogas combusted in year y (m3)
$BG_{flared,y}$	= Biogas flared in year y (m3)

For the calculation of MD_y some conservative assumptions have been considered. The list of the assumptions is as follows-

- (1) 0 value is applied ID.23./wCH₄ (methane %) for period with no monitoring (Please see worksheet "ID 23,24,25,26,29 PE_Flare 2016", column E and "ID 23,24,25,26,29 PE_Flare 2017", column E, ER sheet/3/).

	<p>(2) 0 value is applied ID.25./BGcombusted,y for period with no monitoring (Please see worksheet 'ID_R_C', column K, ER sheet/3/).</p> <p>(3) 0 value is applied ID.26./BGflared,y for period with no monitoring (Please see worksheet 'ID_R_C', column K, ER sheet/3/).</p> <p>(4) (4) 0 value for flame efficiency for entire monitoring period, (Please see worksheet 'MDy', column K36-38, ER sheet/3/).</p> <p>(5) The error factor has been deducted from the parameter methane content (WCH4 ID 23) during the non-calibration period from 24/09/2015 to 21/07/2016.</p> <p>And the $PE_{y, power, ex post}$, $PE_{y, transp, ex post}$ and $PE_{y, phyleakage, ex post}$ were calculated from the equation described in the section E.8.2 of this report. The project emission $PE_{y, res waste, ex post}$ and $LE_{y, ex post}$ has been considered zero as no project emission from biomass generation has been considered and applied methodology does not prescribe any leakage emission.</p> <p>After applying all the possible lowest values in the second calculation method, the total ERs achieved were 19,713 tCO₂e (Please see cell O23, worksheet 'ER', ER sheet/3/) which is still higher than the first method. The comparison of both the values is shown in cell O24, worksheet 'ER', ER sheet/3/.</p> <p>Thus, as per the applied methodology AMS.III.AO version 1.0 para 19 the lowest value of the both the options has been selected which is 19,193 tCO₂ using option (b).</p> <p>The estimated GHG emission as calculated according to the registered PDD is 46,608 tCO₂e. During this monitoring period, total GHG emission reduction or net GHG removals by sinks is achieved to be 19,193 (tCO₂e).</p>
Findings	CAR#12, CAR#14 and CAR#06 were raised and resolved
Conclusion	The verification team confirms that appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project GHG emissions or actual net GHG removals and leakage GHG emissions have been followed; The assumptions, emission factors and default values that were applied in the calculations have been justified.

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

Means of verification	Actual emission reduction is 58.82% lower than the emission reductions for the considered monitoring period as per estimates in the approved PDD/1/. The actual emission reductions claimed to be achieved in the MR is 19,193 tCO ₂ e whereas, estimated ERs in the registered PDD is 46,608 tCO ₂ e.
Findings	None
Conclusion	Justification of lower emission reductions has been included in the section E.6 of the revised MR. The explanation included in the revised MR/2/ was found acceptable. Thus, comparison of actual GHG emission reduction with estimates in revised PDD/1/ was found correct.

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

Means of verification	As the achieved emission reduction are lower than the estimates, no additional explanation was sought from PP.
Findings	None
Conclusion	The difference in emission reduction difference has been given satisfactorily in section E6 of MR.

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

Means of verification	Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 8288 "IOT Mabagas Limited power plant, Pudhuchatram" in India during the period 01/08/2015 to 31/08/2017 (including both days) amount to 19,193 tCO ₂ e.
------------------------------	---

	Verified and certified emission reductions as per commitment period:	
	Commitment period	Amount
	Up to 31/12/2012 (1 st commitment period)	0 tCO ₂ e
	From 01/01/2013	19,193 tCO ₂ e
Findings	None	
Conclusion	Actual GHG emission reductions in the first commitment period (upto 31/12/2012) were found to be 0 tCO ₂ e and for second commitment period (01/01/2013 onwards) were found to be 19,193 tCO ₂ e	

E.9. Assessment of reported sustainable development co-benefits

Means of verification	NA
Findings	NA
Conclusion	NA

E.10. Global stakeholder consultation

Means of verification	NA
Findings	NA
Conclusion	NA

SECTION F. Internal quality control

The draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified or the closed- out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

Earthood Services Private Limited (Earthood), contracted by “Carbonbay GmbH & Co. KG”, has performed the independent verification of the emission reductions for the CDM project activity 8288 “IOT Mabagas Limited power plant, Pudhuchatram” in India for the monitoring period 01/08/2015 to 31/08/2017 (including both days) as reported in the Monitoring Report (public) Version 1 dated 12/07/2018. Carbonbay GmbH & Co. KG is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology AMS-III.AO. ver.01 and AMS-I.D. ver. 17, the monitoring plan contained in the PDD/1/, Monitoring Report (public) Version 1 dated 12/07/2018.

Earthood’s verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated as reported in final MR and corresponding ER sheet.

The verification team confirms that:

- The project activity was found completely implemented as per the description given in the revised PDD.
- The actual operation conforms to the description in the revised PDD.

SECTION H. Certification statement

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity.

In our opinion the GHG emissions reductions reported for the project activity for the period 01/08/2015 to 31/08/2017 (including both days) are fairly stated in the Monitoring Report (final) Version 6 dated 13/03/2020. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS-III.AO. ver.01 and AMS-I.D. ver. 17 and the monitoring plan contained in the PDD.

Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 8288 “IOT Mabagas Limited power plant, Pudhuchatram” in India during the period 01/08/2015 to 31/08/2017 (including both days) amount to 19,193 tCO₂e.

Appendix 1. Abbreviations

Abbreviations	Full texts
AS	Accreditation Standard
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
CER	Certified Emission Reduction(s)
CL	Clarification Request
CPCB	Central Pollution Control Board
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
Earthood	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GOI	Government Of India
IR	Internal Resource
IPCC	Intergovernmental Panel on Climate Change
MOEF	Ministry of Environment and Forests
MR	Monitoring Report
MW	Mega Watt
NABL	National Accreditation Board for Testing and Calibration Laboratories
PDD	Project Design Document
PP	Project Participants
PPA	Power Purchase Agreement
QA/QC	Quality Assurance / Quality Control
tCO ₂ e	tonnes of Carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VCR	Verification and Certification Report

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Kaviraj Singh		
Country	India		
Education	Ph.D. (Environmental Engineering), IIT Delhi Masters (Energy & Environmental), DAVV Indore		
Experience	15 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-II.D., ACM0006, AMS-I.A., AMS-I.C., AMS-II.B., AMS-III.H, ACM0002, ACM0001, AM0080		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1, TA 13.2)		
Reviewed by	Abhishek Mahawar	Date	26/09/2019
Approved by	Ashok Gautam	Date	26/09/2019

Competence Statement			
Name	Anshika Gupta		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	4 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Shreya Garg	Date	12/03/2019
Approved by	Kaviraj Singh	Date	12/03/2019

Competence Statement	
Name	Shreya Garg
Country	India

Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	Date	01/03/2018
Approved by	Ashok Gautam	Date	01/03/2018

Competence Statement			
Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	16 Years +		
Field	Energy, Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C., AMS-I.E, AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Q, AMS-III.Z., AMS-III.AV., AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0012, ACM0006, AM0018, ACM0009, AM0034, AMS.I.B, ACM0003		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Shreya Garg	Date	23/10/2019
Approved by	Anshika Gupta	Date	23/10/2019

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	IOT Mabagas	Registered CDM PDD, Version 5.2 Revised PDD	Dated 03/11/2012 Version 5.5, 12/09/2019	PP
2.	IOT Mabagas	Monitoring Report (Publication) Version 01 Monitoring Report (Final) Version 6	Dated 12/07/2018 Dated 13/03/2020	PP
3.	IOT Mabagas	Emission reduction sheet (Final)	-	PP
4.	Perry Johnson Registrar Carbon Emission Services, Inc	Validation report No. C-1-I-01-S-0167_VA, Version 1.2	Dated 13/11/2012	PP
5.	UNFCCC	Methodology AMS-III.AO. ver.– 13 - Methane recovery through controlled anaerobic digestion	Dated 26/11/2010	Others
6.	UNFCCC	Methodology AMS-I.D. ver. 17– - Grid connected renewable electricity generation	Dated 03/06/2011	Others
7.	UNFCCC	CDM PS for PA	Version 2	Others
8.	UNFCCC	CDM PCP for PA	Version 2	Others
9.	UNFCCC	CDM VVS for PA	Version 2	Others
10.	IPCC	IPCC Guidelines for National Greenhouse Gas Inventories (2006), available at http://www.ipcc-nggip.iges.or.jp/public/2006gl/	-	Others
11.	UNFCCC	UNFCCC webpage for the project: http://cdm.unfccc.int/Projects/DB/PJR%20CDM1353323353.49/view	-	Others
12.	GOI	CO ₂ Baseline Database for Indian Power Sector, Central Electricity Authority. Version 06	Dated January 2011	Others
13.	UNFCCC	Tool to calculate the emission factor for an electricity system, Version 2.2.1	EB 63, Annex 19, dated 29/09/2011	Others
14.	UNFCCC	CDM-MR-FORM	version 7.0	Other
15.	UNFCCC	Tool to determine project emissions from flaring gases containing methane,	EB 28 Annex 13	Other
16.	Union instruments GmbH	Technical specifications for gas analyser INCA4001 series, Version 1.08	2015	Other
17.	IPCC	Emissions From Livestock And Manure Management, Volume 4 Chapter 10 of IPCC Guidelines for National Greenhouse Gas Inventories (2006)	-	Other

18.	Union instruments GmbH & SP Equipment & Services	Calibration certificate for Gas analyser Serial No.94116	Dated 25/09/2012 & 21/07/2016	PP
19.	Endress+Hauser	Calibration certificate for Gas Flow Meter Serial No. HAO 3CE02000	Dated 30/10/2013, 17/01/2017, 08/02/2018	PP
20.	Yadav Measurements Pvt. Ltd.	Calibration Certificate for check energy meter serial no. TNE59499	Dated 27/08/2012	PP
21.	Yadav Measurements Pvt. Ltd.	Calibration Certificate for main energy meter serial no. TNE59496	Dated 30/08/2012	PP
22.	Hi-Tech Calibration Services	Calibration certificate for thermocouple serial number 10-TC-80322, 10-TC-80323, 10-TC-80324, 10-TC-80325	Dated 05/06/2012, 31/12/2015, 17/01/2017	PP
23.	Government of Tamil Nadu	Certificate of calibration of weighbridge	Dated 22/08/2013 26/08/2015	
24.	Thunaivan agencies	Diesel purchase invoice issued to IOT Mabagas	For entire monitoring period	PP
25.	IOT Mabagas Limited	Sample diesel stock inventory	For entire monitoring period	PP
26.	IOT Mabagas Limited	Farmer feedback document	For entire monitoring period	PP
27.	IOT Mabagas Limited	Monthly report of gross generation data	For entire monitoring period	PP
28.	IOT Mabagas Limited	Daily log book data for electricity export and import	For entire monitoring period	PP
29.	IOT Mabagas Limited	Invoice issued to Tamilnadu Generation & Distribution Corporation Limited by PP	For entire monitoring period	PP
30.	IOT Mabagas Limited	Monthly electricity export details	For entire monitoring period	PP
31.	IOT Mabagas Limited	Monthly electricity import details	For entire monitoring period	PP
32.	Tamil Nadu Generation and Distribution Corporation Limited	Export bill issued by Tamil Nadu Generation and Distribution Corporation Limited to PP monthly	For entire monitoring period	PP
33.	IOT Mabagas Limited	Invoice generated for export of fertilizer	For entire monitoring period	PP
34.	IOT Mabagas Limited	'Weighbridge Slips for Customers': Plant records (soft and hard copies) for exported of compost (fertilizer)	For entire monitoring period	PP
35.	IOT Mabagas Limited	Weighbridge slips for import of waste	For entire monitoring period	PP
36.	Tamilnadu Generation A56istributionton Corporation Limited	Commissioning certificate	Dated 24/12/2012	PP
37.	GOI	Power Purchase Agreement	Dated 05/12/2012	PP
38.	IOT Mabagas Limited	Tilling records	For entire monitoring period	PP
39.	GOI	CO2 Emission Database, Version 6.0	Dated March 2011	Others

40.	Tamil Nadu Agricultural University	Methane Emission Potential of Poultry Litter	Dated October 2011	Others
41.	UNFCCC	Tool to calculate baseline, project and/or leakage emissions from electricity consumption	Version 01	Others
42.	NABL	Directory of Accredited Testing Laboratories	Dated 01/02/2015	Others
43.	IOT Mabagas	Gas analyser log data and monthly records	For entire MP	PP
44.	IOT Mabagas	Half hourly and monthly gas flow readings for residual gas	For entire MP	PP
45.	Endress+Hauser	Calibration certificate for Gas Flow Meter at Flare Serial No. HAO 3CF02000	Dated 31/10/2013, 17/07/2017, 20/06/2018	PP
46.	IOT Mabagas	Half hourly and monthly gas flow readings for combusted biogas	For entire MP	PP
47.	IOT Mabagas	Half hourly and monthly records for flared biogas	For entire MP	PP
48.	IOT Mabagas	Diesel consumption records	For entire MP	PP
49.	IOT Mabagas	<ul style="list-style-type: none"> Plant records of half hourly reading of temperature in exhaust gas of flare Monthly generated reports based on half hourly data 	For entire MP	PP
50.	UNFCCC	Methodology AMS.III.D Version 18	-	Others
51.	Google	Maps.google.com	-	Others
52.	ESPL	Verification Report for MP1	Version 3.1	Other
53.	NABL accreditation	http://yadavmeasurements.com/about/	-	Other
54.	ESPL	PRC validation opinion	Version 4.0, 13/03/2020	Other
55.	Yadav Measurements Pvt. Ltd.	Calibration Certificate for main energy meter serial no. 205229/270-3310	Dated 18/08/2018	PP
56.	PP	ER sheet for MP1	-	Other
57.	UNFCCC	https://cdm.unfccc.int/faq/Reference/Standards/meth/reg_stan02.pdf	13/09/2012	Other

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

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

FAR ID	XX	Section no.	XX	Date : DD/MM/YYYY
Description of FAR				
Not applicable				
Project participant response				Date : DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	XX	Section no.	XX	Date : DD/MM/YYYY
Description of CL				
Not applicable				
Project participant response				Date : DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 3. CAR from this verification

CAR ID	01	Section no.	E.8.1.	Date : 17/08/2018
Description of CAR				
As per ER sheet, flare efficiency, for instances where temperature of exhaust gas was below 500 degree Celsius, has been taken as 50%. However, as per "Tool to determine project emissions from flaring gases containing methane", if temperature of the exhaust gas of the flare is less than 500 °C for any particular hour, it shall be assumed that during that hour the flare efficiency is zero.				
Project participant response				Date : 10/09/2018
The flare emission calculation formula is revised with condition that if temp is less than 500 Deg C , then flare efficiency is zero and if flare temp is above 500 Deg C, then 50% flare efficiency is considered for calculations.				
Documentation provided by project participant				
ER sheet				
DOE assessment				Date: 03/12/2018
Formula in ER sheet has been revised. The Assessment team has reviewed the calculation and is found in line with the requirement of the Tool. Hence, CAR#01 is closed.				

CAR ID	02	Section no.	E.6.3.	Date : 17/08/2018
Description of CAR				
There are parameters which has been calculated using sampling methodology, for example ID31, ID32 etc. however, calculation of sample size and its precision and confidence has not been provided in ER sheet.				
Project participant response				Date : 10/09/2018
Sample size, its precision and confidence are calculated and mentioned now.				
Documentation provided by project participant				
ER sheet				
DOE assessment				Date: 03/12/2018
Sample size and it's precision are discussed in the revised ER sheet. The assessment team has checked the details in ER sheet and found it correct. CAR#02 is closed.				

CAR ID	03	Section no.	E.3.	Date : 17/08/2018
Description of CAR				
Calculation of estimated amount of GHG emission reduction for the current monitoring period has not been provided in ER sheet.				
Project participant response				Date : 10/09/2018
It has been mentioned now.				
Documentation provided by project participant				
Monitoring report				
DOE assessment				Date: 03/12/2018
Calculation of estimated GHG emission reduction is now discussed in the revised ER sheet. The assessment team has checked the details in ER sheet and found it correct. CAR#03 is closed.				

CAR ID	04	Section no.	E.1.	Date : 17/08/2018
Description of CAR				
Under section B.1 of the MR, following information is missing inline to CDM-MR-FORM:				
<ul style="list-style-type: none"> • Information about implementation status inline to para 244 of project standard version 9.0 • Information about any events which might have taken place during this monitoring period that may impact the applicability of applied methodology. • Shut down periods of the plant during the monitoring period. 				
Project participant response				Date : 10/09/2018
The information is provided now.				
Documentation provided by project participant				
Monitoring report PDD				
DOE assessment				Date: 03/12/2018
The details as per the requirement of the template is not discussed transparently in section B.1 of the MR. PP is requested to discuss the details in line with the requirement of the MR template. CAR#04 is open.				
Project participant response				Date : 11/02/2019
The commissioning dates as well as information on shutdowns have been added to the report.				
Documentation provided by project participant				
DOE assessment				Date: 18/02/2019
PP has provided the commissioning details of the project activity and information about shutdown in section B.1 of the revised MR. The assessment team has checked and reviewed the PDD and found it correct and in line with the requirements. CAR#04 is closed.				

CAR ID	05	Section no.	E.1.	Date : 17/08/2018
Description of CAR				
Section D.2 of MR does not give following information inline to the CDM-MR-FORM:				
<ul style="list-style-type: none"> • Details of equipment (meters etc.) used for monitoring such as serial number, accuracy etc. • Calibration details, such as date of last calibration, its validity etc. 				
Project participant response				Date : 10/09/2018
The details are now mentioned in Annex 1.				
Documentation provided by project participant				
Monitoring report				
DOE assessment				Date: 03/12/2018
Details of all the monitoring equipments used are provided in Annex-1 of the revised MR. The assessment team has checked the details and found it correct. CAR#05 is closed.				

CAR ID	06	Section no.	E.8.4.	Date : 17/08/2018
Description of CAR				
<p>The values for EGBL(Net electricity supplied by the project activity to the grid) reported in ER sheet and MR on monthly basis were found inconsistent with the monthly invoices verified onsite by the PP for the monitoring period.</p> <p>Also, it's not clear what are the values reported in cell D, G, J in the sheet 'ID_R_Elect'.</p>				
Project participant response				Date : 10/09/2018
<p>This is because for a particular month, the invoice for the parameter 'net electricity supplied' is raised from 27th day of the previous month to 26th of this month whereas the ER sheet contains data from the first day to the last day of the reported month.</p> <p>The columns D, G, J are the primary values reported directly from the energy meters.</p>				
Documentation provided by project participant				
Invoice records and ER sheet				
DOE assessment				Date: 03/12/2018
<p>The value of EGBL is now found consistent in MR and ER sheet. However, PP is requested to clarify the following:</p> <ol style="list-style-type: none"> 1. The values in each month is not consistent with the ER and the team is unable verify in line with the justification provided above. 2. How the values of the data/parameter for 3-4 days from previous months has been adjusted. PP is also requested to provide supportive evidences of adjusted values. <p>CAR#06 is open.</p>				
Project participant response				Date : 11/02/2019
<p>Two sets of values have been provided now. 1 the energy meter readings and 2 the invoiced monthly value. In order to ensure using conservative values, in case of deviations, the smaller of both values are being used for ER calculation. The relevant values have also updated in the MR.</p>				
Documentation provided by project participant				
DOE assessment				Date: 18/02/2019
<ol style="list-style-type: none"> 1. The values are transparently mentioned in the ER sheet and it is now clear. However, the values of EGgross,y and ECpJ,y are not available in invoice. The ER sheet for these value mentions that conservative values are considered, however, these two values are only available in energy meter reading. PP is also requested to clarify that the source of energy meter reading is log book data or there is any other documents such as joint meter reading is available. This point is open. 2. The point raised above is not addressed. PP is requested to justify how the values of the data/parameter for 3-4 days from previous months has been adjusted (with supportive evidences of adjusted values). 3. All monitoring parameters as mentioned in the PDD is not discussed in section D.2 of the MR. <p>CAR#06 is open.</p>				
Project participant response				Date : 21/03/2019
<ol style="list-style-type: none"> 1. The source of data is energy meter readings which are locked in the plants PLC. No other source is available. The ER sheet has been amended accordingly. 2. All monitoring parameters have been added to MR section D.2. 				
Documentation provided by project participant				
DOE assessment				Date: 25/03/2019
<ol style="list-style-type: none"> 1. PP has clarified that there is no other source of data apart from the logbook details form plant. The ER sheet is revised in line with values available in log books. The assessment team has checked the values and calculations in ER sheet and found it correct. Hence, the issue is closed. 2. All monitoring parameter are now discussed in the revised MR. The assessment team has checked the revised MR and it is observed that all the parameters as mentioned in MR are in line with the details available in revised CPA-DD. <p>CAR#06 is closed.</p>				

CAR ID	07	Section no.	E.7.	Date : 17/08/2018
Description of CAR				
<p>The following meter was not found in calibration;</p> <ol style="list-style-type: none"> 1. The energy meter (SN TNE59496) which is being used for monitoring EGBL(Net electricity supplied by the project activity to the grid) was calibrated on 30/08/2012 doesn't cover the complete monitoring period (01/08/2015 to 31/08/2017) because PDD requires meters to be calibrated once in three years. 2. There was a delay observed in calibration of methane analyser and provided calibration records doesn't cover the entire monitoring period. The calibration was conducted on 25/09/2012 which is valid till 24/09/2015. The next calibration was due on 24/09/2015 but was conducted on 21/07/2016 and valid for next three years. A gap in calibration of methane analyser was observed from 24/09/2015 to 21/07/2016. 3. There was a gap observed in the calibration of thermocouples installed on the flare. These thermocouples was not found in calibration from the period starting from 05/06/2015 to 31/12/2015 & 01/01/2017 to 17/01/2017 				
Project participant response				Date : 10/09/2018
<ol style="list-style-type: none"> 1. According to the PPA (section 4.1& 4.6), the meter is supposed to be tested/calibrated as per central electricity authority (CEA) regulation. Please follow page 232 para 18 for the regulation from CEA http://www.cbip.org/MIR/1%20DATA/CEA%201.pdf and it require the meter to be calibrated once in five years which means the calibration was due in August 2017. 2. This parameter is not being used for calculation of CERs therefore it does not affect the final calculations. 3. Attached are the calibration certificates, the calibration was done on 5-Jun 2014 and then again on 17 Jan 2017. 				
Documentation provided by project participant				
Calibration certificates PPA				
DOE assessment				Date: 03/12/2018
<ol style="list-style-type: none"> 1. The PPA has been checked and found that the calibration frequency is once in five years. However, the registered/revised PDD dated 03/11/2012,page-65 mentions that The measuring equipment used for monitoring data is calibrated as per manufacturers specifications, but at least once in three years as per § 17.c of the general guidelines to SSC CDM methodologies (version 17). PP is requested to clarify the same. 2. The purpose of the data as per registered PDD and MR is determination of Emission reduction. Further, as per registered PDD page-67 "The measuring equipment used for monitoring data is calibrated as per manufacturers specifications, but at least once in three years as per § 17.c of the general guidelines to SSC CDM methodologies (version 17)". PP is requested to clarify the same. 3. The calibration certificate dated 06/06/2014 expires on 04/06/2015, Calibration certificate dated 31/12/2015 expires on 31/12/2016, calibration certificate dated 17/01/2017 expires on 17/01/2018. Thus, there is a gap from 05/06/2015 to 30/12/2015 and 01/01/2017 to 17/01/2017. As per registered PDD, the calibration frequency is three years, however the calibration certificates mentions that the calibration is valid until one year. Please justify. <p>CAR#07 is open.</p>				
Project participant response				Date : 11/02/2019
<ol style="list-style-type: none"> 1. The measuring equipment used for monitoring data is calibrated as per manufacturers' specifications, but at least once in five years as per section 4.1& 4.6 of the PPA. This has now been clarified in sections B.2.5., D.2. and Annex 1. 2. An error margin of +0.7% has been determined during calibration and was applied to periods without calibration 3. An error margin of -2,2 °C has been determined during calibration and was applied to periods without calibration. Further, calibration frequency was changed to 1-year calibration frequency as set forth in the calibration certificates. 				
Documentation provided by project participant				
DOE assessment				Date: 18/02/2019

<ol style="list-style-type: none"> 1. PP has provided details for delay in calibration and also considered this under PRC and the calibration frequency is proposed to be once in five year in line with PPA. However, PP has not applied the delay calibration factor for this monitoring period for the calculation of Emission reductions. The issue remains open. 2. PP has applied delay calibration factor for the parameter for which delay is observed. The assessment team has checked the ER sheet and found it correct. Hence, the issue is considered to be accepted and closed. 3. PP has applied error factor for delay in calibration for this monitoring period which is found in line with the requirements. PP has further considered this under PRC and the calibration frequency is revised. Hence, the issue is considered to be closed. 4. There is a temporary deviation mentioned in section B.2.1 of the MR. However, PP has not provided the details of alternative arrangements and applied values in line with para 231 of CDM-PS for PA version 2.0. 5. PP has discussed correction in section B.2.2 of MR. PP is requested to clarify how the change in value of fixed parameters is applicable for correction in line with footnote 24 of CDM-PS for PA version 2.0. 6. PP is requested to list all PRCs considered during this verification under appendix-7 of the PDD. CAR#07 is open. 	
Project participant response	Date: 21/03/2019
<ol style="list-style-type: none"> 1. The calibration is valid only until 29 August of 2017. However, since energy readings for billing purpose have taken place on 27th August the entire period of the Monitoring Period, which has been used to claim for CERs, has been covered with a calibrated energy meter. 4. To account for paragraph 231 of the project standard a value of "0" is being applied to the emission reduction sheet. This fix is mentioned in section D.2. and Annex 1 of the Monitoring Report. 5. The correction has been mentioned erroneously and was deleted from the MR. 7. The temporary deviation has now been mentioned in Annex 7. 	
Documentation provided by project participant	
DOE assessment	Date: 08/04/2019
<ol style="list-style-type: none"> 1. PP has considered the calibration frequency under post registration changes and the calibration frequency is updated to once in five years in line with the PPA. The assessment team has checked the documents and is found correct. Since the calibration frequency is not under the PP and PP has to follow the frequency in line with the PPA, hence the assessment team considered this correct and accepted. Thus, the calibration frequency is in line with the revised PDD. 4. PP has applied a value '0' during the period for temporary deviation. The assessment team has found this conservative and hence accepted and closed out. 5. There is no correction applied by the PP during this Monitoring period and the erroneous para has been removed in revised MR. The assessment team has checked the revised MR and found it correct. 7. PP has also mentioned all post registration changes in appendix-7 of the revised PDD. The assessment team found it in line with the requirement with the PDD template. 	
CAR#07 is closed.	

CAR ID	08	Section no.	E.6.2.	Date : 17/08/2018
Description of CAR				
Some of the sample values, conducted for DAFw,I (Average incremental distance for waste type I (poultry litter, agri waste and cow dung) transportation, were taken from previous monitoring period.				
Project participant response				Date : 10/09/2018
The feedstocks substrates are being purchased only from our regular suppliers. For the last 4 years the suppliers have not been changed, so the distance is fixed for each substrate.				
Documentation provided by project participant				
ER sheet				
DOE assessment				Date: 03/12/2018
The justification provided by the PP is found accepted. Hence, CAR#08 is closed.				

CAR ID	09	Section no.	E.6.2.	Date : 17/08/2018
Description of CAR				

The value for methane % (Methane content in the biogas (dry), ID.23./ wCH4, %) are not reported in the ER sheet.	
Project participant response	Date : 10/09/2018
This parameter is mentioned now.	
Documentation provided by project participant	
ER sheet	
DOE assessment	Date: 03/12/2018
The values are reported in ER sheet. The assessment team has checked and reviewed the ER sheet and found it correct.	
CAR#09 is closed.	

CAR ID	10	Section no.	E.6.2.	Date : 17/08/2018
Description of CAR				
The values of, ID. 24./FVRG,h, m3/h (Volumetric flow rate of the residual gas in dry basis at normal conditions in hour h) were not reported in ER sheet. However, PDD requires this parameter to be monitored and reported.				
Project participant response				Date : 10/09/2018
The values are reported in the 'PE_Flare' sheet.				
Documentation provided by project participant				
ER sheet				
DOE assessment				Date: 03/12/2018
The values are reported in ER sheet transparently. The assessment team has checked the data and found correct. Hence, accepted and closed out.				
CAR#10 is closed.				

CAR ID	11	Section no.	E.6.2.	Date : 17/08/2018
Description of CAR				
The values the parameter ID 27 in PDD (for frequency of tilling) has not been reported in the MR & ER sheet.				
Project participant response				Date : 10/09/2018
The values could be found in the attached documents mentioned below.				
Documentation provided by project participant				
Tilling Records for the period Aug 15- Dec 16 Tilling records for the period Jan 17- Dec 17				
DOE assessment				Date: 03/12/2018
The values are available in the submitted documents and is accepted. However, the values are not reported in MR and ER sheet in line with the registered PDD.				
CAR#11 is open.				
Project participant response				Date : 11/02/2019
Tilling values have now been added to section D.2. of the MR as well as in worksheet "ID_R_QC" of the ER sheet.				
Documentation provided by project participant				
DOE assessment				Date: 18/02/2019
PP has provided the tilling details in the revised MR. The assessment team has checked the values and the details and found it correct. Hence CAR#11 is closed.				

CAR ID	12	Section no.	E.8.4., E.8.2.	Date : 17/04/2019
Description of CAR				

1. At certain places in the ER calculation work sheet 'ID 23,24,25,26,29 PE_Flare 2015', "ID 23,24,25,26,29 PE_Flare 2016" & "ID 23,24,25,26,29 PE_Flare 2017"), the PE from flaring have been computed as negative. Please refer for example time stamp 07-09-15 15:27 and all such cases have been highlighted green in ER sheet for your ready reference.
2. The calculation of PEpower from electricity consumption in a year is assumed to be zero in worksheet 'PE_Power', cell H17-H41. However, the total amount of electricity imported by the project activity for the monitoring period is 0.02824 GWh in sheet titled 'ID_R_Elec", cell K9 -K33, parameter ID20. Kindly justify.
3. PP shall provide justification for following observations identified in the ER calculation sheet submitted to assessment team:
 - a) Worksheet titled "ID 23,24,25,26,29 PE_Flare 2015", column F (eg:F13 to F1215) reported methane content, however there was no biogas flow reported for these dates and cells, rather a '0' values reported for all these dates (please refer cells C13 to C1215).

The values are red highlighted in the worksheet titled "ID 23,24,25,26,29 PE_Flare 2015", "ID 23,24,25,26,29 PE_Flare 2016", "ID 23,24,25,26,29 PE_Flare 2017"-
 - b) In some cases (dates) the values of temperature of flare has been reported as negative. For example, cell G5851 to G7552 in the worksheet titled "ID 23,24,25,26,29 PE_Flare 2015".
 - c) In sheet titled "ID 23,24,25,26,29 PE_Flare 2016", in some rows, eg: row 42420, 43306, 43307 (all such cells are highlighted pink), the gas flow to flare and CHP were observed, however, no methane content is reported against these cells under column D.

Project participant response**Date : 26/05/2019**

1. To ensure conservativeness, all such values have been corrected to "0"
2. The inks into worksheet 'ID_R_Elec", were erroneous and have been corrected.
3. a) The values were referring to a constant value. All items were corrected
 - b) Values were referring to the maximal permissible error which turn the values in negative, if no measurements are recorded. The values have no been corrected for such cases.
 - c) Instrument failure has let to the lack of recording. However, no emission reductions have been claimed for such periods. Further, in case of gas flow to the flare, the default methane content is being applied, which increases project emissions. The overall approach is therefore considered conservative.

Documentation provided by project participant**DOE assessment****Date: 30/04/2019**

1. The negative values were erroneous entries which have been removed now.
2. The cells were linked to incorrect column in the ER sheet, which has now been corrected.
3. a) Incorrect values have been removed.
 - b) The values appear negative because of error factors and thus they are correct.
 - c) highest value of methane content has been applied for the period when the monitoring has been missed. The approach was found to be conservative.

Thus, the CAR stands closed.

CAR ID	13	Section no.	E.7.	Date : 02/09/2019
Description of CAR				

The paragraph 366 of the VVS for PA version 2	
<ol style="list-style-type: none"> 1) The DOE (p 22) states that "Due to late calibration of the gas meter the maximum permissible error of +0.7% has been applied to parameter ID.23 in periods without valid calibration 24/09/2015 to 21/09/2016". However, the DOE (p 21) states that ID.23 is monitored using a gas analyser with +-1% accuracy class. The DOE is required to provide further information on how it applied the requirement of the VVS for PA by 1) providing the outcome of the delayed calibration and 2) thermal mass flow meter (+-1.8% of reading +0.1%, HA0 3CE02000) was calibrated on 30 October 2013 (valid until 30 October 2016) and on 17 January 2017. The DOE (p 39) states that "Error of 0.1% has been applied for the delay period." 3) flow meter (+-0.1%, HA0 3CF02000) for monitoring BGcombusted,y was calibrated on 30 October 2013 (valid until 30 October 2016). The DOE (p 25) states that "Next calibration details are not provided. Delay between period 30/10/2016-31/08/2017 was observed." The DOE (p 39-40) states that "Error factor +-0.1% has been applied for the delay period." 	
Project participant response	Date : 03/12/2019
<ol style="list-style-type: none"> 1- the maximal error identified during calibration according to the certificate is indeed 1%. Values have been changed in MR and ER sheet accordingly. 2- The error percentage of +-1.8% is applied now as conservative approach. 3- The error percentage of +-1% is applied now as conservative approach. 	
Documentation provided by project participant	
DOE assessment	
Date : 09/12/2019	
<ol style="list-style-type: none"> 1. Maximum error factor (+-1%) from the last calibration certificate has been applied in the ER sheet for the delay period. Closed. 2. As per the calibration certificate of the flow meter (HA0 3CE02000) dated 17/01/2017, the error was found to be within the limit. Thus, as per para 366(a) the PP shall apply maximum permission error of the instrument (0.1% as per manufacturer's specification of the meter). As a conservative approach PP has proposed to apply a more conservative error factor +-1.8%. The factor has been consistently applied in the MR and ER sheet. Closed. 3. As per the calibration certificate of the flow meter (HA0 3CF2000) dated 17/07/2017, the error was found to be within the limit. Thus, as per para 366(a) the PP shall apply maximum permission error of the instrument (0.1% as per manufacturer's specification of the meter) for the period from 30/10/2016 to 16/07/2017. However, PP has voluntarily proposed to apply a more conservative error factor +-1%. The factor has been consistently applied in ER sheet and also reported the details of next calibration in MR. 	
CAR is CLSOED	

CAR ID	14	Section no.	E.8.4.	Date : 02/09/2019
Description of CAR				
<p>The PP shall clarify whether the calculations of baseline GHG emissions or baseline net GHG removals, project GHG emissions or actual net GHG removals, and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents.</p> <p>The applied methodologies, AMS-III.AO. ver. 1(paragraph 19) and AMS-III.D ver. 18 (paragraph 18) referred in the PDD, requires the PP to compare the emission reduction determined ex post and the emission reduction calculated based on the equations defined in the methodology and to consider the lowest value as the emission reduction achieved in any year. The PP is required to provide further information how the calculation of the emission reduction has been done as per the applied methodology considering that the comparison between two values were not done.</p>				
Project participant response				Date : 03/12/2019
The calculation has been shown through both the methods and the comparison has been done transparently shown in the ER sheet now. The lowest of two has been considered as the final achieved emission reduction claimed for the current MP.				
Documentation provided by project participant				
DOE assessment				
				Date: 09/12/2019

The value of parameter "MDy" has been recalculated in the ER sheet and evident in the MR and found consistent as per the applied methodology. The value of the BEy,expost has been used for the baseline emission consideration conservatively as the value of BEy,expost is lower.

However, for the calculation of MDy. Some of the values of BG combusted, BG burnt, BG flared are directly punched. PP shall link these values with the base values transparently while calculating the expressions used to arrive MDy.

Thus, the CAR stands open.

Project participant response	Date: 15/12/2019
<i>The directly inserted values were replaced applying a consistent rational for linking the values.</i>	
Documentation provided by the CME	
NA	
DOE assessment	Date: 20/01/2020
PP has revised the values of the BG combusted, BG burnt, BG flared. For the calculation of MDy some conservative assumptions have been considered. The list of the assumptions is as follows-	
<ol style="list-style-type: none"> 1- The value of the parameter BG_{flared,y} (ID 26) and parameter BG_{combusted,y} (ID 25) has been taken zero during the non- monitoring period of Dec 2016 – April 2017 and May 2016 – Aug 2016. 2- The value of the parameter BG_{flared,y} (ID 26) and parameter BG_{combusted,y} (ID 25) has been taken zero during the non-calibration period of Oct 2016 – July 2017. 3- The flare efficiency is considered zero. 4- Negative error factor has been considered in the parameter methane content (WCH4 ID 23) during the non-calibration period from 24/09/2015 to 21/07/2016. 5- Zero flame efficiency has been considered in the worksheet titled 'MDy'. 	
PP has linked these values with the base values transparently while calculating the expressions. The assumed values and the calculation have been checked and found correct.	
Thus, the CAR stands closed.	

CAR ID	15	Section no.	E.6.2.12	Date : 12/03/2020
Description of CAR				
As per tool to determine project emissions from flaring gases containing methane, if temperature of the exhaust gas of the flare is less than 500 C for any particular hour, it shall be assumed that during that hour the flare efficiency is zero." However, "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017" of "8288 ER sheet" show that flare efficiency of 50% were applied where there were no reported temperature values, i.e. "-", in the column G (ID29 Thermocouples).				
Project participant response				Date : 13/03/2020
ER sheet has been revised				
Documentation provided by project participant				
Revised ER sheet Revised MR version 6.0				
DOE assessment				Date: 13/03/2020
The ER sheet, worksheet titled "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017" were checked. For all cells the temperature was not monitored (under column G), the flare efficiency has been considered 0(under column H). This has increased the total project emissions, Thus reduced the total number of ERs.				
Thus, the CAR is closed.				

Table 4. FAR from this verification

FAR ID		Section No.		Date : DD/MM/YYYY
Description of FAR				

Project participant response	Date : DD/MM/YYYY
Documentation provided by project participant	
DOE assessment	Date: DD/MM/YYYY

There is no FAR from this verification.

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		