Monitoring report form

(Version 04.0)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT	
Title of the project activity	Gianyar Waste Recovery Project
Reference number of the project activity	1885
Version number of the monitoring report	01
Completion date of the monitoring report	06/01/2015
Registration date of the project activity	04/11/2008
Monitoring period number and duration of this monitoring period	Number 5 for 01/01/2014 to 31/12/2014, first and last day included
Project participant(s)	Yayasan Pemilahan Sampah Temesi and myclimate – The Climate Protection Partnership
Host Party(ies)	Indonesia
Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)	Sector 13, Waste handling and disposal. AMS-III.F. ver. 5 - Avoidance of methane production from decay of biomass through composting
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	GHG emission reductions: 9,609 CO_2e for this monitoring period including reductions accumulated from prior years Anthropogenic GHG removals by sinks: NA
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	GHG emission reductions: 7510 CO_2e for this monitoring period including reductions accumulated from prior years. Anthropogenic GHG removals by sinks: NA
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	NA
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	7510 CO_2e Anthropogenic GHG removals by sinks: NA

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

a) The technology used and the measures applied in this project activity are to avoid the generation of methane from the biomass fraction of municipal waste that otherwise would have been left for anaerobic decay in a solid waste disposal site without methane capture and flaring or power production. The decay is prevented through aerobic treatment by composting the organic waste fraction and proper soil application of the compost. The proper composting process is secured by adequate compost handling procedures and measures, including active aeration.

b) Waste separation and composting are done in a covered area of 4740 m^2. Coarse organic material may be shredded prior to being composted. The windrows are then turned in 2 to 3 week intervals with an excavator. When the decomposition has reached the stadium of raw compost, the material is passed through sieves with 9 or 5 mm mesh sizes. Depending on demand, the sieved raw compost is sold directly or further cured to finished compost. To assure an aerobic process, the windrows are aerated with blowers to guarantee an oxygen level of at least a 6 % throughout the process. Generally however, the project activity will maintain oxygen levels around 12 %.

c) The project activity milestones are:

Project planning	2004 to 2008, including operation of a pilot plant
Project construction:	1st phase of 2340 m^2: 1st semester 2008 2nd phase of 2400 m^2: 2nd semester 2009
Project commissioning:	1st phase of 2340 m^2: May 2008 for processing up to 30 tons of organic waste per day 2nd phase of 2400 m^2: January 2010 for processing up to 50 tons of organic waste
Operating Periods:	Uninterrupted since May 2008

d) Total net emission reductions achieved in this monitoring period amount to **7510 tons CO_2e**.

A.2. Location of project activity

a) Host Party Indonesia
b) Region of Gianyar / Province of Bali
c) Town of Temesi
d) Project activity location in Temesi, Gianyar: (new by GPS, in PDD from map)
e) Longitude: E 115º 20' 59" Latitude: S 8º 33' 58"

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Party A (host): Indonesia	Private entity A: Yayasan Pemilahan Sampah Temesi Public entity A: NA	No
Party B: Switzerland	Private entity B: myclimate, The Climate Protection Partnership Public entity B: NA	No
NA	NA	NA

A.4. Reference of applied methodology and standardized baseline

(a) Applied methodology:

III.F. Avoidance of methane production from biomass decay through composting (Version 05): https://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_6NOS8D6BN7GD231AN3DVLG1EPPYXUK/AMS_III.F_rev_ver05.pdf?t=aGF8bmhhYnphfDBAdep_G5UPBkmbrkugprlq

The baseline methodology used is described in detail in Appendix B of the simplified modalities and procedures for small-scale project activities: "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activities".

Note: the estimation of the baseline emissions for this methodology refers to the III.G. Landfill Methane Recovery using the First Order Decay model (FOD).

(b) Additional methodologies and methodological tools used:

1. AMS-III.G.: Landfill methane recovery (all Versions):
   https://cdm.unfccc.int/methodologies/DB/QPVDNPHDG8302KQ5EPGD3OC57KVA3Q

2. I.D. Grid connected renewable electricity generation (Version 13):
   https://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_PHPV5WESACMBTJ2YY54GAJYSIEI3HD/AMS_I.D_rev_ver13.pdf?t=Ymt8bmhhZDVwfDC0n334iIYaOn4zyI-JW1mV
   For the purpose of estimating the project emissions from electricity, the grid emission factor of the project grid has been determined per AMS I.D. in its latest version.

3. Tool to determine methane emissions avoided from dumping waste at solid waste disposal site (Version 02):
   https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-04-v2.pdf

4. Tool for the demonstration and assessment of additionality (Version 3):
   https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v3.pdf
   The additionality has been determined following the "Tool for demonstration and assessment of additionality", version 03, considering simplifications for small-scale projects as appropriate.

(c) Applied standardized baseline(s):
Not applicable to this project activity.

A.5. Crediting period of project activity

Fixed crediting period starting 04/11/2008 for a duration of 10 years.

A.6. Contact information of responsible persons/ entities

See Appendix 1

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The Gianyar Waste Recovery Project was an environmental mission of the Rotary Club of Bali Ubud. Already in 2005 the three project activity objectives were defined to:
1) become a CDM project,
2) establish a replicable model facility,
3) design a low cost - low tech - low risk facility.
The project activity was preceded by a pilot plant operation during which all relevant parameters were researched and optimized to assure later an efficient process. The pilot plant was operational from 2004 to April 2008. In December 2008 the project ownership and operation was turned over to a village based NGO, the Yayasan Pemilahan Sampah Temesi. The volume processed in the pilot plant is a "prior activity" that is deducted from the baseline emission.

The CDM project activity was implemented in two phases:

1st Phase:	A 2340 m^2 covered processing area with a capacity of maximum 30 tons per day. Construction 1st semester 2008 / commissioning May 2008
2nd Phase:	A 2400 m^2 extension to 4740 m^2 with a final capacity of up to 50 tons per day. Construction 2nd semester 2009 / commissioning January 2010
Implementation status:	Fully implemented as a small scale project activity.

In each phase the processing volume was increased progressively, although monthly variations occurred mostly due to Hindu holidays, Ramadan and/or varying availability of waste separating personnel. While the project activity started in May 2008, the CDM registration was received only on 04/11/ 2008.

Incoming waste is manually separated with hand tools. When deemed necessary, coarse material is shredded prior to composting to accelerate decomposition. Shredding brings little or no advantage when there is a substantial amount of slow decomposing material like palm leaves in the organic waste. During the decomposition process, air is forced into the composting material with help of centrifugal blowers to assure aerobic conditions. Also the composting material is turned in about two week intervals to loosen the material. Turning in an inside-out fashion also achieves equal decomposition conditions for all material and a hygienization by heat, which destroys pests and pathogens. After the decomposition has reached the raw compost phase, the composting material is sieved to separate the resulting compost from residue. The residue is returned to incoming organic waste or treated separately for continued decomposition, while the raw compost is further aerated and thus processed to finished compost.

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

No temporary deviations from the registered monitoring plan or the applied methodology have been applied during this monitoring period.

B.2.2. Corrections

No corrections from project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring report.

B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

No permanent changes from the registered monitoring plan or the applied methodology have been approved during this monitoring period or submitted with this monitoring report.

B.2.4. Changes to project design of registered project activity

No permanent changes to the project design of the registered project activity have been approved during this monitoring period or submitted with this monitoring report.

B.2.5. Changes to start date of crediting period

No changes to the start date of the crediting period have been approved during this monitoring period or submitted with this monitoring report or submitted with this monitoring report.

B.2.6. Types of changes specific to afforestation or reforestation project activity

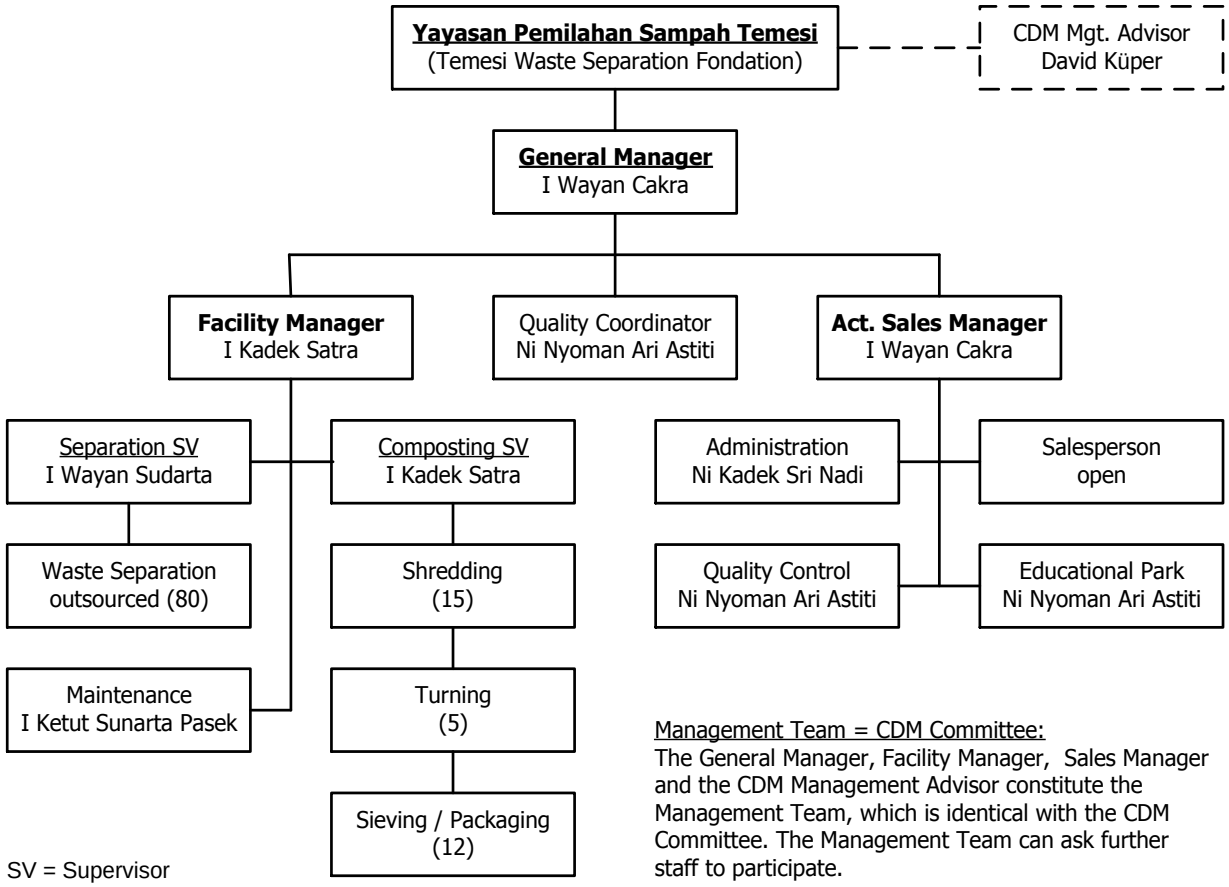
Not applicable to this project activity.

SECTION C. Description of monitoring system

C.1. Introduction and Organizational Chart

The facility management has introduced a Quality System that was designed similar to ISO 9000. This Quality System has three hierarchical levels. The first level is the Quality Manual. The second level is Operating Procedures. The Operating Procedures (OP) describe the activities that need to be carried out to assure compliance with CDM related issues. They also serve to achieve the desired quality level of our products and services. Furthermore, they define how CDM and quality records are maintained to provide evidence of monitoring. Refer to Annex 8 for a list of the Operating Procedures.

The following diagram depicts the Organizational Chart as of December 31, 2014:



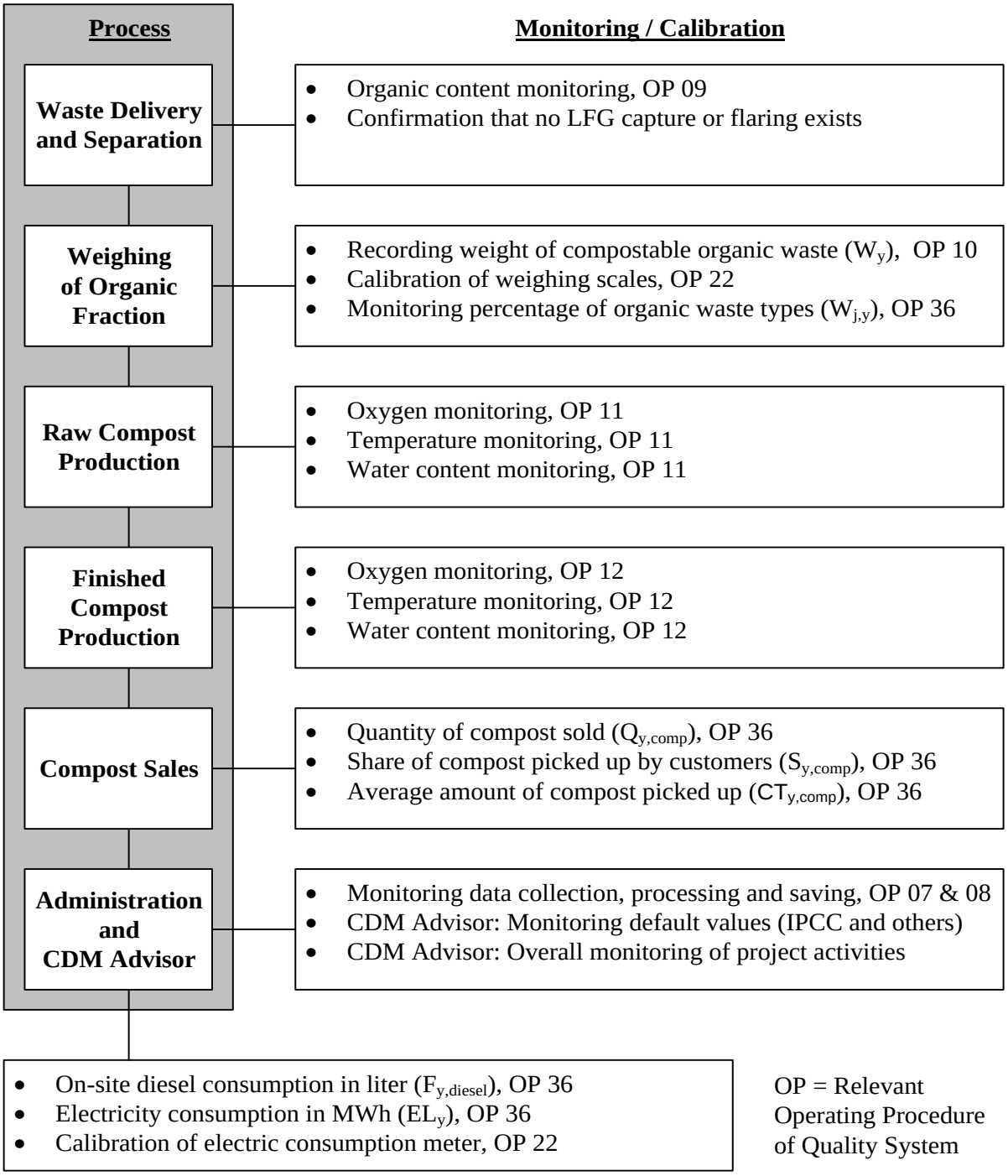
C.2. Monitoring management

All CDM related responsibilities are covered in the Quality System that is implemented under the responsibility of the Managers. The CDM Management Advisor has the overall responsibility for the project's CDM monitoring and verification. The responsibilities delegated by the Facility Manager and Sales Manager are defined in the various Operating Procedures of the Quality System.

C.3. Monitoring process

All monitoring processes are defined in their respective Operating Procedures (OP) of the Quality System, which contain the details for reliable measurement and recording of the parameters. The original versions of the Operating Procedures are available in English language, but they are not obligatorily updated. The Indonesian language versions are the binding versions and they are updated if required.

The following diagram shows the monitoring points and required equipment calibrations:



C.3.1. Waste measurement and project emissions

The Operating Procedures for the measurement and recording of quantity of waste processed, waste composition, energy consumption, and transport emission are referred to in the diagram above and the related sections of section E. Emission reductions calculations.

C.3.2. Assuring aerobic conditions for decomposition

The PDD requires no specific monitoring to assure aerobic conditions. Many other composting projects do not monitor oxygen and water content, relying only on regular turning of the compost heaps.

This project activity monitors the control of aerobic decomposition of organic waste. They are described in OP 11 Raw Compost Production, OP 12 Finished Compost Production and OP 13 Specialty Compost Production. The recording of oxygen content, temperature and water content is defined in OP 17 Compost Production Monitoring. The oxygen content and temperature are measured and recorded 2 times per week, while the water content is measured and recorded 2 times per month. It must be noted

that the temperature has no influence on aerobic conditions. However, the oxygen and water content should be kept at recommended levels to assure an aerobic decomposition.

The water content is determined by drying wet processing material and measuring the weight difference on calibrated weighing scales.

The oxygen content is measured with a self-calibrating oxygen meter. The chemical sensor of the device is subject to a miniscule but constant deterioration until it is used up and the instrument displays an error message. Therefore each time before use, the oxygen meter needs to be recalibrated with ambient air, which has an oxygen concentration of 20.95%. Thus, yearly calibrations would be inadequate.

C.3.3. Other parameters required by the methodology

Other parameters are determined according to the following Operating Procedures:

- Analysing the compost quality is covered in OP 18 Compost Quality Control.
- Tools for market development and other customer support are covered in OP 31 Customer Support.
- The assessment of common practices at the adjacent landfill (absence of methane capture) is confirmed by written statements of the landfill operator and verifiable on site.

C.4. Data recording and archiving

Data recording is done according to the respective Operating Procedures and data storage is performed according to OP 07 Quality Record Storage.

C.5. Quality control procedures

The Quality System includes procedures that allows all personnel to report problems or irregularities that are then addressed by the Management Team / CDM Committee.
Personnel have two possibilities to report irregularities:

- Issue a Non-Conformity Report (NCR) according to OP 27 Non-Conformities.
- Refer to a potential problem according to OP 28 Quality Alerts.

The Facility Manager is responsible for the yearly calibration of the weighing scales (balances) used to weigh the organic waste that is composted and the compost that is sold or used to determine the waste types. The calibration of the weighing scales and kW-meters is performed according to OP 22 Calibrated Equipment. According to the PDD, no other equipment requires calibration. The summary of equipment calibrations is in Annex 7.

The Facility Manager and the Sales Manager are responsible to routinely reviewing quality procedures and to request changes at the quarterly Management Team / CDM Committee meetings.

C.6. Report compilation and verification

The input for the Monitoring Report is made available by the Facility Manager and Sales Manager or their staff. The CDM Management Advisor reviews the inputs and then compiles and submits the Monitoring Report to the DOE.

SECTION D. Data and parameters

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

Table 1

Data / Parameter:	φ
Unit:	-
Description:	Model corrections factor to account for model uncertainties
Source of data:	See below
Value(s) applied):	0.9
Purpose of data:	Baseline emission calculation
Additional comment:	Default value selected as proposed by methodology.

Table 2

Data / Parameter:	**OX**
Unit:	-

Description:	Oxidation factor (reflecting the amount of methane from SWDS that is oxidized in the soil or other material covering the waste)
Source of data:	See below
Value(s) applied):	0
Purpose of data:	Baseline emission calculation
Additional comment:	0.1 is to be used for managed solid waste disposal sites that are covered with oxidizing material such as soil or compost. For other solid waste disposal sites a value of 0 can be used. The landfill where the waste would be disposed in the absence of the composting project activity is not covered with oxidizing material; hence a value of 0 is appropriate.

Table 3

Data / Parameter:	**F**
Unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	0.5
Purpose of data:	Baseline emission calculation
Additional comment:	IPCC default value as proposed by the methodology is applied.

Table 4

Data / Parameter:	**DOC_f**
Unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	0.5
Purpose of data:	Baseline emission calculation
Additional comment:	IPCC default value as proposed by the methodology is applied.

Table 5

Data / Parameter:	**MCF**
Unit:	-
Description:	Methane correction factor
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	0.8
Purpose of data:	Baseline emission calculation
Additional comment:	MCF for the following types of solid wastes disposal sites are possible:

Disposal site type	**MCF**
Managed – anaerobic	1.0
Managed – aerobic	0.5
Unmanaged – deep (>5m) or high water table	0.8
Unmanaged – shallow (<5m)	0.4
Uncategorised SWDS	0.6

The landfill where the waste would be disposed in the absence of the composting project activity has an average depth of 6 meters and the waste is mechanically compacted. Hence, a value between 1 and 0.8 would be appropriate. For conservativeness a value of 0.8 has been applied.

Table 6

Data / Parameter:	**DOC_j**
Unit:	-

Description:	Fraction of degradable organic carbon (by weight) in the waste type *j*
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Value(s) applied):	DOC_j values for wet waste have been applied → see below
Purpose of data:	Baseline emission calculation
Additional comment:	The methodology distinguishes between five types of waste and respective DOC_j values under wet and dry waste conditions given as percentage of the total organic waste stream of the project activity:

Waste type j	**% DOC wet waste**	**% DOC dry waste**
Wood and wood products	**43**	50
Pulp, paper and cardboard (other than sludge)	**40**	44
Food, food waste, beverages and tobacco (other than sludge)	**15**	38
Textiles	**24**	30
Garden, yard and park waste	**20**	49

Measures of the moisture content have shown values between 45-50% of the total waste amount (depending also on seasonal climatic circumstances and the waste composition). On average, the waste can be considered as wet waste and respective DOCj values as given in the second column above apply.

Table 7

Data / Parameter:	**k_j**
Unit:	-
Description:	Decay rate for the waste type *j*
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 3.3
Value(s) applied):	K_i values for tropical / wet conditions have been applied → see below
Purpose of data:	Baseline emission calculation
Additional comment:	The methodology is based on the IPCC 2006 Guidelines and gives the following default values for tropical conditions:

Waste type j		**Tropical (MAT* > 20°C)**	
		Dry (MAP < 1000 mm)**	**Wet (MAP** > 1000 mm)**
Slowly degrading	Pulp. Paper, cardboard, textiles	0.045	**0.07**
	Wood, wood products, straw	0.025	**0.035**
Moderately degrading	Garden and park waste	0.065	**0.17**
Rapidly degrading	Food, food waste, beverages, tobacco	0.085	**0.4**

*MAT: mean annual temperature
**MAP: mean annual precipitation

Bali is located in tropical area with MAP of around 1700 mm per year and an average annual temperature (MAT) of 27°C. Therefore the proposed k values for wet conditions can be used. Temperature and precipitation values and references for Bali are presented in Annex 3 of the PDD.

Table 8

Data / Parameter:	**EF_{diesel}**
Unit:	kg/l
Description:	Diesel CO_2 emission factor
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	2.664

Purpose of data:	Project emission calculation
Additional comment:	The emission factor of diesel in kg/l has been calculated using IPCC default values for: NCV diesel: 43.33 GJ/t Density diesel: 0.83 kg/l CO_2 emission factor diesel: 74.07 t/TJ

Table 9

Data / Parameter:	**EF_{grid}**
Unit:	t CO_2/MWh
Description:	Grid emission factor
Source of data:	Decision on the meeting on determination of CDM emission factor of JAVA-MADURA-BALI (JAMALI) Grid submitted by Chevron and agreed by the committee, Directorate General of Electricity and Energy Utilization, Jakarta, Indonesia, Friday, 11 March 2006).
Value(s) applied):	0.728
Purpose of data:	Project emission calculation
Additional comment:	This emission factor is estimated based on ACM 0002. Reference for cross checking: Directorate general electricity and energy utilization, Renewable energy division, 2006. Since no data is directly available to the project developer and also not expected to be available in the coming years, this emission factor remains fixed over the crediting period. However, with regard to the small amount of emissions resulting from power consumption this approach is considered appropriate. Determined ex-ante and fix over crediting period.

Table 10

Data / Parameter:	**$EF_{transport}$**
Unit:	kg CO_2 / km
Description:	Average CO_2 emissions per 100 km of customer vehicles used for compost transport
Source of data:	Based on estimated average values and IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied):	0.2664 kg/km
Purpose of data:	Project emission calculation
Additional comment:	This factor is calculated using the EF_{diesel} (2.664 kg/l) times estimated average diesel consumption of customer vehicles per 100 km (12 l). Determined ex-ante and fix over crediting period.

Table 11

Data / Parameter:	**$TWCOM_{BAU}$**
Unit:	t
Description:	Maximum amount of organic waste processed for composting per year in the BAU scenario (pilot facility)
Source of data:	Plant records
Value(s) applied):	595 t per year (source PDD)
Purpose of data:	Baseline emission calculation
Additional comment:	This figure reflects a conservative approach. It was calculated based on the average processed total volume per day (2 t) times the maximum operating days of the plant (350), times the average organic fraction of the waste (= 85 % according to reality and PDD Section B.6.3.). Determined ex-ante and fix over crediting period.

D.2. Data and parameters monitored

Table 12

Data / Parameter:	**f**
Unit:	-
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Measured/ Calculated / Default:	There are no LFG capture and flaring installations at the landfill. However, the landfill operator will issue yearly a confirmation that no such equipment is installed and operated.
Source of data:	On-site inspection and written confirmation by landfill operator
Value(s) of monitored parameter:	0
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Monitoring frequency: yearly. There are no values to be measure, read or recorded, except the written confirmation from the landfill operator mentioned above.
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 03
Purpose of data:	Baseline emission calculation
Additional comment:	None

Table 13

Data / Parameter:	**GWP_{CH4}**
Unit:	t CO_2e / t CH_4
Description:	Global warming potential (GWP) of methane, valid for the relevant commitment period
Measured/ Calculated / Default:	Default
Source of data:	UNFCCC
Value(s) of monitored parameter:	A value of 21 was applied for the first commitment period and a value of 25 is applied for the second commitment period commencing January 1, 2013.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	There are no values to be measured read or recorded
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Baseline emission calculation
Additional comment:	After each commitment period GWP is adjusted according UNFCCC decisions

Table 14

Data / Parameter:	**$W_y = TWCOM_y$**
Unit:	t
Description:	Total organic waste prevented from disposal in period y
Measured/ Calculated / Default:	Total weight of organic waste composted is determined directly on weighing scales instead of calculated by deducting recycled and landfilled waste from total delivered waste. This alternative is more accurate and allowed according to PDD Section B.7.2. (paragraph on waste measurement)
Source of data:	Plant records

Value(s) of monitored parameter:	11,787.52 t (Source Annex 1)
Monitoring equipment:	Analogue scales sentisimal, serial no. B 040704, B 070494, 110967, B 910007, B 1102217 and digital scale AND AD 4406 serial no. P3507372. The calibrations were performed on February 7, 2014 by UPT Meterologi, Bali. The calibrations are due yearly with the next calibration being scheduled for February 2015
Measuring/ Reading/ Recording frequency:	The weight is measured continuously on calibrated scales. The readings are first recorded as raw data and then transferred to electronic files
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 03 and 10
Purpose of data:	Baseline emission calculation
Additional comment:	This parameter is measured directly. It is not calculated. Current and previous calibrations are listed in Annex 7

Table 15

Data / Parameter:	$\mathbf{p_{n,j,y}}$
Unit:	t
Description:	Weight fraction of waste type j in the sample n collected during period y
Measured/ Calculated / Default:	The weight of each fraction is determined on scales
Source of data:	Plant records
Value(s) of monitored parameter:	2014: A=6.183% / B=4.067% / C=9.225% / D=0.183% / E=80.342% (Source Annex 2)
Monitoring equipment:	Analogue scales sentisimal, serial no. B 040704, B 070494, 110967, B 910007, B 1102217 and digital scales AND AD 4406 serial no. P3507372, Ohaus Scout, Serial No. 7129350044 and KRIS EK3550, The calibrations were performed on February 7, 2014 by UPT Meterologi, Bali. The calibrations are due yearly with the next calibration being scheduled for February 2015
Measuring/ Reading/ Recording frequency:	Sampling is undertaken quarterly (4 times a year at 3 different days. Sample size 100 kg each day) on calibrated scales. The average of these samplings is recorded in electronic files as weight fraction of waste type
Calculation method (if applicable):	A detailed written sampling procedure is applied to ensure a consistent approach over the crediting period. (see Operating Procedure 36, PDD Section B.7.2 and Annex 4 of the PDD)
QA/QC procedures:	Operating Procedures 03 and 36
Purpose of data:	Baseline emission calculation
Additional comment:	Current and previous calibration are listed in Annex 7

Table 16

Data / Parameter:	$\mathbf{W_{total,y}}$
Unit:	t
Description:	Total waste delivered to the composting facility in period y
Measured/ Calculated / Default:	-
Source of data:	-
Value(s) of monitored parameter:	This value is not needed and thus not monitored, because the weight of organic waste composted is determined directly (see Table 14)

Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	-
Additional comment:	This is one of two options allowed in the PDD

Table 17

Data / Parameter:	**$W_{recycled,y}$**
Unit:	t
Description:	Waste fraction processed for recycling in period y
Measured/ Calculated / Default:	-
Source of data:	-
Value(s) of monitored parameter:	This value is not needed and thus not monitored, because the weight of organic waste composted is determined directly (see Table 14)
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	
Additional comment:	This is one of two options allowed in the PDD

Table 18

Data / Parameter:	**$W_{landfill,y}$**
Unit:	t
Description:	Waste fraction diverted to landfill in period y
Measured/ Calculated / Default:	-
Source of data:	-
Value(s) of monitored parameter:	This value is not needed and thus not monitored, because the weight of organic waste composted is determined directly (see Table 14)
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	-
Additional comment:	This is one of two options allowed in the PDD

Table 19

Data / Parameter:	**$F_{y,diesel}$**
Unit:	Liter
Description:	Total consumption of diesel composting of facility in period y
Measured/ Calculated / Default:	The volume of diesel fuel is calculated
Source of data:	Plant records
Value(s) of monitored parameter:	13,979.3 (Source Annex 5)
Monitoring equipment:	The diesel fuel is purchased at various government owned fuel stations.
Measuring/ Reading/ Recording frequency:	Monitoring frequency: continuously. Purchase records and invoices are used to determine the diesel consumption, which is then recorded in electronic files
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 36
Purpose of data:	Project emission calculation
Additional comment:	None

Table 20

Data / Parameter:	**EL_y**
Unit:	MWh
Description:	Total power consumption of composting facility in period y
Measured/ Calculated / Default:	The power consumption is measured
Source of data:	Plant records
Value(s) of monitored parameter:	51.196 (Source Table 28)
Monitoring equipment:	Power consumption is directly measured with a kWh meter with serial number 14070367744 and an accuracy class rating of Cl.1. The last calibration was performed on December 14, 2012 by UPT Meterologi, Bali. The calibrations are due every 5 years with the next calibration being scheduled for November 2017
Measuring/ Reading/ Recording frequency:	Direct meter readings are obtained and confirmed by the governmental electric company PNL at the end of each year.
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 03 and 36
Purpose of data:	Project emission calculation
Additional comment:	The governmental electric company PLN on December 14, 2012 replaced our post payment meter with a new mandatory prepaid meter, where kWh units must be bought and manually entered on-site to the kWh meter. For this monitoring period, the power consumption from February 6, 2014 to December 31, 2014 is the difference of the meter readings for these dates. The February 6, 2014 reading of 30,137 kWh was verified on site by the verifying team during the 4th verification and the December 31, 2014 reading was verified by PLN. Because no PLN confirmed reading is available for December 31, 2013, the following conservative solution was applied for the period from January 1, 2014 to February 6, 2014: For these 37 days the maximum load limit of the kWh meter of 33 kW was multiplied by 37 days and 24 hours a day (33 kW x 24 hrs x 37 days = 29,304 kWh). Theen the two values are added in Table 28 Current and previous calibrations of the kWh meter are listed in Annex 7

Table 21

Data / Parameter:	**$Q_{y,comp}$**
Unit:	t
Description:	Amount of compost sold in period y
Measured/ Calculated / Default:	The weight of compost produced is not measured. It is an unstable value because weight loss occurs due to water evaporation while the compost is stored. However, the amount of compost sold is measured and recorded. The use of compost sold is in agreement with the PDD, which on page 29 defines $Q_{y\ comp}$ also as "Quantity of compost produced / sold in year y". Therefore the more suitable "Amount of compost sold" is used, which is accurately measured at point of sale and thus renders far more accurate calculation of $PE_{y,transport}$
Source of data:	Plant records
Value(s) of monitored parameter:	1598.1 t (Source Annex 6)
Monitoring equipment:	Analogue scales sentisimal, serial no. B 040704, B 070494, 110967, B 910007, B 1102217 and digital scale AND AD 4406 serial no. P3507372. The calibrations were performed on February 7, 2014 by UPT Meterologi, Bali. The calibrations are due yearly with the next calibration being scheduled for February 2015
Measuring/ Reading/ Recording frequency:	Quantity of compost sold is measured and recorded continuously in the sales statistic
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 19, 30 and 36
Purpose of data:	Project emission calculation
Additional comment:	Current and previous calibrations are listed in Annex 7

Table 22

Data / Parameter:	**$S_{y,comp}$**
Unit:	
Description:	Share of compost bought and transported by customers in period y
Measured/ Calculated / Default:	The share of compost picked up by customers at the facility is calculated with data taken from the sales statistic
Source of data:	Plant records
Value(s) of monitored parameter:	0.4785 (Source Annex 6)
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Each monitoring period
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 30 and 36
Purpose of data:	Project emission calculation
Additional comment:	None

Table 23

Data / Parameter:	**$CT_{y,comp}$**
Unit:	t
Description:	Average capacity of vehicles used by customers

Measured/ Calculated / Default:	The average weight of compost picked up by customers at the facility is calculated with data taken from the sales statistic
Source of data:	Plant records
Value(s) of monitored parameter:	1.317 t (Source Annex 6)
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	Monitoring by expert estimations at the end of the crediting period
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 36
Purpose of data:	Project emission calculation
Additional comment:	None

Table 24

Data / Parameter:	**DAF_{comp}**
Unit:	Km / vehicle
Description:	Average return distance for compost transportation
Measured/ Calculated / Default:	The distance driven by customers to pick-up compost at the facility is estimated using sales data and expert judgement.
Source of data:	Expert estimation
Value(s) of monitored parameter:	62 km / vehicle, which corresponds to the back and forth distance from the facility to Denpasar. This is a conservative assumption as the majority of customers are located between the two locations.
Monitoring equipment:	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures:	Operating Procedure 36
Purpose of data:	Project emission calculation
Additional comment:	None

D.3. Implementation of sampling plan

D.3.1. Description of implemented sampling design

A detailed written sampling procedure is applied to ensure a consistent approach over the crediting period (see Operating Procedure 36 as well as PDD Section B.7.2. and Annex 4). The size and frequency of sampling required in the sampling plan provides statistically significant data with a maximum uncertainty range of 20% (= sampling error of +/- 10%) and a 95% confidence level.

D.3.2. Collected data

A summary of the collected sampling data is provided in Annex 2 of the MR. The detailed results of the sampling procedure are shown in the separate spreadsheet “Details of Waste type percentage”.

D.3.3. Analysis of collected data

The percentage of waste types has been relatively stable since the beginning of the crediting period. Nevertheless, these small yearly changes are recorded in the spreadsheets for each year (see summary in Annex 2). A sensitivity study on the impact of changes in the percentage of waste types revealed that an unrealistic large 10% change in each waste type has virtually no impact on the resulting CO_2e (see: Sensitivity analysis for variations in waste type percentage, 130127).

D.3.4. Complying with the required confidence/precision level

As the waste types have proven to be relatively stable since the beginning of the crediting period, the daily sample size has been reduced in 2013 to the 100 kg proposed in the PDD, Annex 4. This decision has been taken after a sensitivity analysis was performed (see D.3.3.). The statistical significance of the new 100 kg sample size was investigated with the result that it provides the 95% confidence level and 20% maximum uncertainty range (10% sampling error) required by PDD in Annex 4 (see: Details of the waste type sampling plan, 140112).

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

E.1.1. Introduction

As described in section B.6.1. of the PDD, the baseline emissions are calculated based on the First Order Decay (FOD) Model. The detailed calculations are available to the DOE from the UNFCCC project website: http://cdm.unfccc.int/Projects/DB/SGS-UKL1214472977.27/view as Annex 1 - BE spreadsheet, or directly from: http://cdm.unfccc.int/UserManagement/FileStorage/7OXD4P48Q7CKOWOQAU9CK89E4H4T5V

This BE spreadsheet allows scenario calculations by changing the input of the various parameters to represent the actual project activity during the monitoring period, like tons processed and waste types.

No GHG removals by sinks apply for this project activity.

E.1.2. Actual amount of organic waste processed

Of the two methods possible according to the PDD, the project has chosen to determine the actual weight of compostable organic waste directly after the waste separation on calibrated weighing scales according to Operating Procedure (OP) 10 Weight Control.

The BE spreadsheet is based on processing yearly 14,875 tons of organic waste into compost (Cell D3). Any yearly deviation from this amount is adjusted in the spreadsheet by inserting the percentage of actual tons processed in percent of the 14,875 tons into row 30 "Deposition trend" of the respective year. All other years remain zero. Calculating each year individually is necessary because the BE spreadsheet of the PDD cannot handle different yearly waste type percentages. See Annex 4 for more details.

Table 25: Actual amount and Depositiojn Trend of organic waste

Description	**Unit**	**Value**
PDD planned amount for trend calculation	tons	14,875.00
Actual amount of organic waste in tons (Annex 1)	tons	11,787.52
Deposition trend in % of PDD plan	**Percent**	**79.244%**

E.1.3. Percentage of waste types (W_j)

The methodology distinguishes between five types of waste. Table 26 below shows the sampled amounts of organic waste type for each monitoring year in percent of total organic waste as measured according to OP 36 CDM Monitoring Process, which complies with the details provided in Annex 4 of the PDD.

The percentages of the different waste types are filled into column D, rows 20 to 24 of the BE spreadsheet. Column D row 25 is always 0 as glass is separated before the waste type determination.

Table 26: Percentage of organic waste types

Waste types (j_y)	**PDD**	**this year**
A. Wood, wood products	3.00%	6.183%
B. Pulp, paper and cardboard	0.50%	4.067%
C. Food, food waste, beverages and tobacco	3.00%	9.225%
D. Textiles	0.50%	0.183%
E. Garden, yard and park waste	93.00%	80.342%
Total organic waste	**100.00%**	**100.000%**

Source: Annex 2, Percentage of waste types

E.1.4. Other parameters

All default parameters are used as indicated in section D.1.

E.1.5. Total baseline emission

The total baseline emission for the monitoring period is calculated by inserting the data from Table 25 and 26 into the baseline reduction spreadsheet for the monitored year (see supporting documents submitted to the DOE). The same is done with the relevant values of all past years. A sample spreadsheet was submitted with the PDD and an excerpt of the spreadsheet for the monitored year is in Annex 3. The values obtained in row 46 of the BE spreadsheet are then entered in Table B of Annex 4.

Table 27: Total gross baseline emission

Description	**Unit**	**Value**
Total gross baseline emission (Source: Annex 4, Table B)	**t CO_2e**	**7,997.791**

E.2. Calculation of project emissions or actual net GHG removals by sinks

In this Monitoring Report the project emissions are accumulated as follow:

- Electrical power emissions by facility — E.2.1.: Tables 28 and 29
- Diesel emissions by facility from equipment like shredders, excavator, etc. — E.2.2.: Tables 30 and 31
- Diesel emissions by facility trucks — E.2.2.: Tables 30 and 31
- Diesel emissions by customers transports — E.2.3.: Tables 32

To calculate the project emissions during the monitoring period, the energy consumption of each energy type is listed separately in the respective tables below. The same applies for the quantity of compost sold used to calculate customer transport emission.

E.2.1. Calculation of emissions from power consumption (PE_{power})

The power consumption is determined according to OP 36 CDM Monitoring Process.

Special calculation for 2014:
For this monitoring period, the power consumption from February 6, 2014 to December 31, 2014 is the difference of the meter readings for these dates. The February 6, 2014 reading of 30,137 kWh was verified on site by the Verifying Team during the 4th verification (see Verification and Certification Report, 4th period). The December 31, 2014 reading was verified by the governmental PLN.

Because no confirmed reading was available for December 31, 2013, the following conservative solution was applied for the period from January 1, 2014 to February 6, 2014: For these 37 days the maximum load limit of the kWh meter of 33 kW was multiplied by 37 days and 24 hours a day (33 kW x 24 hrs x 37 days = 29,304 kWh).

Table 28: Total of power consumption

Description		**Unit**	**Value**
Power consumption for period 01/01/2014 to 06/02/2014:			
	Total hours (37 days x 24 hours)	hours	888
	Maximum load kWh meter	kW	33
	Maximum possible power consumption (hours x kW)	kWh	29,304
Power consumption for period 06/02/2014 to 31/12/2014:			
	Reading 31/12/2014 (by PLN)	kWh	52,029
	Reading 06/02/2014 (by verifying team for MR 4)	kWh	30,137
	Total power consumption 06/02/2014 to 31/12/2014	kWh	21,892
Total power consumption		kWh	51,196
EL	**Total power consumption**	**MWh**	**51.196**

Source: Table 20 (with explanation)

Table 29: Total power emission

Parameter	Description	Unit	Value
EL	Power consumption	MWh	51.196
EF_{grid}	Emission factor of Java–Madura–Bali grid (Table 9)	t CO_2/MWh	0.728
PE_{power}	**Emission from power consumption**	**t CO_2e**	**37.271**

Formula: $PE_{power} = EL * EF$ (source of formula: PDD equation 6)

E.2.2. Calculation of emission from diesel consumption of facility equipment and trucks (PE_{diesel})

The facility equipment and truck diesel consumption is determined monthly according to OP 36 CDM Monitoring Process. The truck diesel consumption includes diesel for transports that are not related to the project activity. However, as this diesel consumption is difficult to separate and to be conservative, it is included the truck diesel consumption. The facility equipment and truck fuel consumptions are summarized in Annex 5 then entered into Table 30 below, where they are added up.

Table 30: Facility diesel consumption

Description	Unit	Value
Liter of facility equipment diesel (Annex 5)	liter	12,140.3
Liter of facility truck diesel (Annex 5)	liter	1,839.0
Total facility diesel consumption	**liter**	**13,979.3**

Table 31: Total facility diesel emissions

Parameter	Description	Unit	Value
$F_{diesel, liter}$	Facility diesel consumption (Table 30)	liter	13,979.3
D_{diesel}	Density of diesel (ICPP, Table 8)	kg/l	0.83
$F_{diesel, tons}$	Facility diesel consumption	tons	11.603
NCV_{diesel}	Net caloric value of diesel fuel (IPCC, Table 8)	GJ/t	43.33
EF_{diesel}	CO_2 emissions factor for diesel (IPCC, Table 8)	t CO_2/TJ	74.07
PE_{diesel}	**Emission from facility diesel consumption**	**t CO_2e**	**37.239**

Formula: $F_{diesel, tons} = F_{diesel, liter} * D_{diesel} / 1000$

Formula: $PE_{diesel} = F_{diesel, tons} * NCV / 1000 * EF$

Sources: PE: equation 7 and Table 6 in PDD / IPCC values: PDD

E.2.3. Calculation of emissions from customer transport ($PE_{transport}$)

The raw data to calculate the emissions from customer transports (pick up) are determined according to OP 36 CDM Monitoring Process. Transport emissions for waste delivery to the facility are not included, because the project site is on the former landfill site that already received all waste before the project activity begun.

The transport of finished compost to customers consumes diesel fuel and adds to project emissions. The diesel used by facility trucks to deliver compost is already included in the total facility truck diesel consumption in Table 30.

However, additional transport emissions are generated by customers picking up compost at the facility. They are calculated in the following Tables 32, based on precise data from Annex 6 and expert judgment for the average distance for transport.

The PDD on page 29 defines Q_{comp} as quantity compost produced / sold. The project activity uses compost sold and the known fraction of compost picked up by customers, which are both available from the sales statistic. This renders a precise result contrary to using compost produced which would require more expert estimations.

Table 32: Total transport diesel emissions by customers

Parameter	Description	Unit	Value
Q_{comp}	Total compost sold during monitoring period (Annex 6)	tons	1,598.1
S_{comp}	Fraction of compost picked up by customers (Annex 6)		0.4785
CT_{comp}	Average truck capacity for customer transport (Annex 6)	tons	1.317
DAF_{comp}	Average distance for compost transport (Table 24)	km/truck	62
$EF_{transport}$	CO_2 emission factor for diesel (Table 10)	kg/km	0.2664
$PE_{transport}$	**Emission from customer compost transport**	**t CO_2e**	**9.592**

Formula: PE = (Q * S / CT) * DAF * (EF / 1000) (source of formula: PDD equation 5)

Source of Q comp, S comp and CT comp: Annex 6 / Source of EF transport: Table 10

Source DAF comp: Expert estimate from Table 24

E.2.4. Total project emissions (PE_{tot})

Table 33: Total project emissions

Description	Units	Value
Total emissions from total power (Table 29)	t CO_2e	37.271
Total emissions from facility equipment & truck diesel (Table 31)	t CO_2e	37.239
Total emissions from transport diesel (Table 32)	t CO_2e	9.592
Total project emissions	t CO_2e	84.101
Rounded-up value	**t CO_2e**	**85**

E.3. Calculation of leakage

No leakage needs to be considered, since no composting technology equipment is transferred from or to another activity (L_y=0)

Total leakage: 0 t CO_2e

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

E.4.1. Emission reduction due to the project activity

Table 34: Emission reduction due to project activity before adjustment

Description	Units	Value
Total gross baseline emission (Table 27)	t CO_2e	7,997.791
minus Total project emissions (Table 33)	t CO_2e	84.101
minus Total leakage (E.3.)	t CO_2e	0.000
Emissions reduction due to project activity	**t CO_2e**	**7,913.690**

Source of formula: PDD equation 8

E.4.2. Adjustment for volumes processed in the baseline case

No provision is made in the mandatory Monitoring Report Form 04.0 for the adjustment for volumes processed in the baseline case. The calculation of the adjustment is inserted only here as section E.4.2., because the adjustment requires the value of Table 34 “Emission reduction due to project activity”:

The emissions reduction after the deduction of the project emission and leakage must be adjusted by a factor (1 - r) for organic waste volumes already processed in the baseline case, i.e. the volume processed prior to the project activity in the pilot plant. This adjustment is made according to equation 10 of the PDD which is ER = ER * (1 - r). The adjustment factor (r) is calculated by dividing the amount of organic waste that has been processed in the pilot plant during the length of the length of the monitoring period by the actual amount organic waste processed during the monitoring period.

Table 35: Calculation of adjustment factor r and (1 - r)

Parameter	Description	Units	Value
$WCOM_{BAU}$	Prior project activity in pilot plant (Table 11)	tons	595.000
$TWCOM_y$	Project activity (Table 25 and Annex 1)	tons	11,787.523
	Adjustment factor r		0.05048
	Adjustment (1 - r)		**0.94952**

Formula: Adjustments factor r = Prior activity ($WCOM_{BAU}$) / Project activity ($TWCOM_y$)

Source of formula: PDD equation 10

Table 36: Adjustment to gross baseline emission due to prior project activity in pilot plant

Description	Units	Value
Gross emissions reduction due to project activity (Table 34)	t CO_2e	7,913.690
Adjustment factor (1 - r) (Table 35)		0.94952
Net emissions reduction due to project activity (Formula 1)	t CO_2e	7,514.230
Adjustments to gross baseline emission (Formula 2)	**t CO_2e**	**399.460**

Formula 1: Adjustment factor (1 - r) * Gross emissions reduction due to project activity (Table 35)

Formula 2: Difference between gross and net

Source of formula: PDD equation 9

Table 36 above corresponds to PDD equation 9. However while rendering a correct emission reduction (ER) result, it cannot be used in the mandatory Monitoring Report Form Version 04.0, which makes no provision for the sequence of calculations proposed in the PDD. As a consequence, the required net baseline emission is calculated in Table 37 and its value is inserted as baseline emission in summary table of Section E.4.

Table 37: Adjustment to baseline emission for the prior project activity in the pilot plant

Description	Unit	Value
Gross baseline emission (Table 27)	t CO_2e	7,997.791
Adjustment due to prior activity in pilot plant (Table 36)	t CO_2e	399.460
Net baseline reduction for Summary Table of section E.4.	t CO_2e	7,598.331
Rounded-down value	**t CO_2e**	**7,598**

Formula: Total gross baseline reduction - Emissions from priort activity

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	**7598**	**88**	**0**	**7510**

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	9,609	7510

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

The actual emission reductions achieved during this monitoring period are smaller than the PDD estimate. The reason is that it is difficult to recruit a sufficient number of waste separators on the island

of Bali, which offers more attractive occupations. Little waste was processed during Ramadan (the vast majority of waste separators are Muslim migrant workers from Java). After Ramadan many waste separators did not return and could only slowly be replaced. Thus we could not process the planned amount of waste and consequently received too little organic material to process into compost.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	NA	7510

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Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☒ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Yayasan Pemilahan Sampah Temesi
Street/P.O. Box	Jl. Raya Temesi Selatan
Building	TPA
City	Temesi, Gianyar
State/Region	Bali
Postcode	80551
Country	Indonesia
Telephone	+62 361 7438083
Fax	none
E-mail	temesi.compost@gmail.com
Website	www.temesirecycling.com
Contact person	David Kuper
Title	MSc, MBA
Salutation	Mr.
Last name	Kuper
Middle name	Herbert
First name	David
Department	CDM
Mobile	+62 81 2466 2250
Direct fax	none
Direct tel.	none
Personal e-mail	dkuper@indo.net.id

Annexes to Monitoring Report

1 Organic waste processed 2014 (workable Excel spreadsheet is available for the DOE)
2 Percentage of waste types 2014 (workable Excel spreadsheet is available for the DOE)
3. Excerpt of baseline emission spreadsheet 2014 (complete workable Excel spreadsheet is available for the DOE)
4. Calculation of total baseline emission 2008 to 2014 (workable Excel spreadsheet is available for the DOE)
5. Summary of project energy consumption 2014 (workable Excel spreadsheet is available for the DOE)
6. Summary of transport emissions 2014 (workable Excel spreadsheet is available for the DOE)
7. Calibration of weighing scales and kW-meter 2014
8. Index of the Operating Procedures of the Quality System
9. Summary of BE, PE and ER 2014 (workable Excel spreadsheet is available for the DOE)

Above annexes are an integral part of the Monitoring Report. The Supporting Documents below contain details that are made available to the DOE for the verification.

Supporting documents for the DOE (not exhaustive)

$GWPCH_4 = 21$: Details of 2008 BE for 2008 to 2012 $GWPCH_4 = 21$ for Annex 4
Details of 2009 BE for 2009 to 2012 $GWPCH_4 = 21$ for Annex 4
Details of 2010 BE for 2010 to 2012 $GWPCH_4 = 21$ for Annex 4
Details of 2011 BE for 2011 to 2012 $GWPCH_4 = 21$ for Annex 4
Details of 2012 BE for 2012 $GWPCH_4 = 21$ for Annex 4

$GWPCH_4 = 25$: Details of 2008 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2009 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2010 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2011 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2012 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2013 BE for 2013 to 2018 $GWPCH_4 = 25$ for Annex 4
Details of 2014 BE for 2014 to 2018 $GWPCH_4 = 25$ for Annex 4

Calculation of BE and PE calculation 2014 (linked tables 25 to 37 of MR)
Details of baseline emission 2008 to 2014 (for Annex 4)
Details of sales – transport emission 2014
Summary of waste type percentage 2014
Summary of total energy consumption 2014
Summary of total organic waste 2014
Sampling plan for waste types 140112
Sensitivity analysis for waste type percentages 130127

Annex 1: Organic waste processed 2014

Copied from spreadsheet: Details of total organic waste 2014

In kilograms

Date	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	354,767	1,693	29,785	38,794	25,807	26,279	41,536	21,631	9,671	40,797	41,709	33,351	43,714
2	372,961	4,143	30,949	39,757	34,649	26,521	37,529	21,376	10,686	39,076	41,432	30,683	56,160
3	360,325	4,650	34,041	38,983	30,151	29,687	33,409	23,242	4,887	44,759	39,005	31,898	45,613
4	369,973	9,017	29,961	40,916	34,006	28,998	31,422	23,103	8,803	39,885	39,882	36,151	47,829
5	360,854	8,771	38,442	36,147	38,185	30,237	30,884	23,493	21,974	40,236	0	39,386	53,099
6	390,471	10,824	26,391	40,744	33,283	34,537	30,272	20,205	19,942	43,713	44,668	35,065	50,827
7	392,788	9,989	36,685	39,570	38,106	30,676	31,532	23,328	13,887	33,546	44,148	40,863	50,458
8	386,604	10,033	27,368	36,457	38,206	31,664	31,705	19,589	19,194	40,530	37,170	43,881	50,807
9	407,427	8,890	39,229	39,264	36,952	30,020	35,023	21,287	21,188	45,785	40,608	39,881	49,300
10	399,170	9,519	34,960	40,962	33,162	31,344	35,700	19,144	27,699	47,243	40,980	32,745	45,712
11	395,504	7,931	43,284	40,842	32,471	29,873	29,533	14,063	24,354	47,153	41,742	40,247	44,011
12	386,036	7,415	28,859	35,745	35,631	29,610	29,049	16,814	25,828	49,484	39,775	37,774	50,052
13	400,886	8,478	39,894	39,621	38,038	30,533	29,471	14,164	24,278	51,005	37,387	42,024	45,993
14	405,744	4,335	35,519	41,099	38,935	32,681	32,379	13,782	32,547	44,709	41,838	47,700	40,220
15	420,874	7,976	41,054	44,466	42,364	30,143	28,572	14,145	32,393	46,084	46,281	41,334	46,062
16	395,084	7,472	33,734	36,727	37,084	29,053	27,929	16,941	27,381	52,552	40,045	43,948	42,218
17	369,341	7,889	40,164	41,444	43,596	30,375	27,554	13,582	30,585	51,599	41,744	40,809	0
18	390,673	8,042	33,049	39,767	35,871	31,143	27,896	9,618	31,035	44,514	38,202	37,790	53,746
19	406,655	9,152	42,374	41,409	39,773	31,706	24,903	9,062	30,500	52,233	40,998	39,891	44,654
20	404,896	8,988	37,948	39,480	41,802	34,033	25,306	8,539	34,522	45,796	43,794	41,449	43,239
21	356,537	10,428	42,344	30,592	39,109	0	25,302	8,890	34,333	46,394	39,724	34,672	44,749
22	409,590	11,744	46,730	41,577	34,616	38,211	25,181	10,222	38,757	34,554	41,916	39,472	46,610
23	404,026	13,555	44,114	38,142	28,994	29,107	26,123	7,861	33,681	53,680	42,340	41,272	45,157
24	370,114	13,873	45,185	35,060	8,307	33,287	23,565	7,081	34,371	47,595	33,841	45,763	42,186
25	393,580	16,594	50,376	32,962	13,374	36,194	27,309	8,540	41,597	48,743	35,127	43,643	39,121
26	409,318	18,679	42,994	31,072	43,493	35,582	25,410	7,870	32,056	53,407	37,199	44,701	36,855
27	368,457	18,557	45,054	34,017	35,497	33,409	24,539	6,898	39,721	44,259	40,236	46,270	0
28	416,333	20,670	37,759	29,496	29,917	37,905	26,414	8,259	45,582	53,001	41,737	38,078	47,515
29	370,316	19,243	0	32,576	38,631	33,969	27,174	7,407	42,852	42,028	35,463	50,202	40,771
30	368,438	34,173	0	28,852	32,546	28,919	22,235	7,257	41,306	44,855	39,705	48,466	40,124
31	149,781	28,326	0	0	0	0	0	8,232	40,658	0	33,642	0	38,923
Total	11,787,523	361,049	1,058,246	1,126,540	1,032,556	915,696	874,856	435,625	876,268	1,369,215	1,202,338	1,209,409	1,325,725

Total = 11,787,523 kilograms

11,787.523 tons

Annex 2: Percentage of waste types 2014

Copied from spreadsheet: Details of waste type percentage 2014 for Annex 2

Organic waste for composting:

Sampling Year	Sampling Month	Sample Size	Unit	A. Wood, wood products	B. Pulp, paper cardboard	C. Food, food waste, tobaco, beverages	D. Textiles	E. Garden, yard park waste	Total organic waste

1. Percentage of waste types of prior years

2009	4x / yr	800	kg	5.051%	5.756%	7.416%	0.000%	81.777%	100.000%
2010	4x / yr	800	kg	4.613%	4.238%	8.225%	0.125%	82.800%	100.000%
2011	4x / yr	800	kg	4.675%	3.988%	9.119%	0.313%	81.906%	100.000%
2012	4x / yr	800	kg	4.400%	3.500%	12.100%	0.213%	79.788%	100.000%
2013	4x / yr	1800	kg	5.667%	4.014%	8.042%	0.611%	81.667%	100.000%

2. Percentage of waste types 2014

2014	January	300	kg	22.5	11.2	24.0	0.3	242.0	300.0
2014	April	300	kg	15.6	6.2	39.1	0.5	238.6	300.0
2014	July	300	kg	14.0	16.0	22.2	1.0	246.8	300.0
2014	October	300	kg	22.1	15.4	25.4	0.4	236.7	300.0
			kg	74.2	48.8	110.7	2.2	964.1	1,200.0
Total	**2014**		**%**	**6.183%**	**4.067%**	**9.225%**	**0.183%**	**80.342%**	**100.000%**

3. Average of waste types 2009 to 2014

Average 2009 to 2014	**%**	**5.1%**	**4.3%**	**9.0%**	**0.2%**	**81.4%**	**100.0%**

Organic waste in percent of total waste: about 85%

Annex 3: Excerpt of baseline emission spreadsheet 2014

Copied from workable spreadsheet: Details of 2014 BE for 2014 to 2018 GWPCH4 = 25 for Annex 3 and 4

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	**Parameter**	**Variable**	**Unit**	**Value**									
2	Project commissioning year		y	2008									
3	Waste deposition per year		t / y	14,875									
4	Waste deposition days per year		d	350									
5	Deposition trend			0%									
6	Midpoint year			1									
7	Landfill closure (in years)			30									
8	Waste conditions			wet									
9	Regional climatic conditions			tropical									
10	Regional precipitation conditions			wet									
11	Model correction parameter for uncertainties	Phi		0.9									
12	Fraction of methane captured in the baseline	f		0.0									
13	Global warming Potential CH4	GWPCH4		25									
14	Oxidation factor	OX		0.0									
15	Fraction of methane in LFG	F		0.5									
16	Fraction of degradable organic carbon	DOCf		0.5		Determination of DOCj and kj depending on input parameters. Do not edit this table!							
17	Mass ratio CH4:C	16/12		1.33		Degradable organic carbon DOCj (fraction)		Decay rate kj				Applied Parameters	
18	Methane correction factor	MCF		0.8				boreal / temperate climate		tropical climate			
19	Waste stream					wet waste	dry waste	dry	wet	dry	wet	DOCj	kj
20	Wood and wood products	A	%	6.183%		0.43	0.50	0.020	0.030	0.025	0.035	0.43	0.035
21	Pulp, paper and cardboard	B	%	4.067%		0.40	0.44	0.040	0.060	0.045	0.070	0.40	0.070
22	Food, food waste, beverages and tobacco	C	%	9.225%		0.15	0.38	0.060	0.185	0.085	0.400	0.15	0.400
23	Textiles	D	%	0.183%		0.24	0.30	0.040	0.060	0.045	0.070	0.24	0.070
24	Garden, yard and park waste	E	%	80.342%		0.20	0.49	0.050	0.100	0.065	0.170	0.20	0.170
25	Glass, plastic, metal other inert	F	%	0.000%		0.00	0.00	0.000	0.000	0.000	0.000	0.00	0.000
26	Total		%	100.000%									
27													
28	**Calculations**												
29			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
30	Deposition trend:		0%	0%	0%	0%	0%	0%	79.244%	0%	0%	0%	0%
31	**Year**		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
32	**Waste deposition**												
33	Wood and wood products	t / year	0.00	0.00	0.00	0.00	0.00	0.00	728.86	0.00	0.00	0.00	0.00
34	Pulp, paper and cardboard	t / year	0.00	0.00	0.00	0.00	0.00	0.00	479.36	0.00	0.00	0.00	0.00
35	Food, food waste, beverages and tobacco	t / year	0.00	0.00	0.00	0.00	0.00	0.00	1,087.40	0.00	0.00	0.00	0.00
36	Textiles	t / year	0.00	0.00	0.00	0.00	0.00	0.00	21.61	0.00	0.00	0.00	0.00
37	Garden, yard and park waste	t / year	0.00	0.00	0.00	0.00	0.00	0.00	9,470.29	0.00	0.00	0.00	0.00
38	Waste deposition total	t / year	0.00	0.00	0.00	0.00	0.00	0.00	11,787.52	0.00	0.00	0.00	0.00
39	Waste deposition (cumulative)	t	0.00	0.00	0.00	0.00	0.00	0.00	11,787.52	11,787.52	11,787.52	11,787.52	11,787.52
40	**Methane emissions**												
41	Wood and wood products	t CO2e/yr	0	0	0	0	0	0	65	62	60	58	56
42	Pulp, paper and cardboard	t CO2e/yr	0	0	0	0	0	0	78	73	68	63	59
43	Food, food waste, beverages and tobacco	t CO2e/yr	0	0	0	0	0	0	323	216	145	97	65
44	Textiles	t CO2e/yr	0	0	0	0	0	0	2	2	2	2	2
45	Garden, yard and park waste	t CO2e/yr	0	0	0	0	0	0	1,777	1,499	1,265	1,067	900
46	Methane emissions total	t CO2e/yr	0	0	0	0	0	0	2,244	1,852	1,539	1,287	1,082

Annex 4: Calculation of total baseline emission 2008 to 2014

Values copied from workable spreadsheets: Details of BE for 2008 to 2014 with GWPCH4 21 and GWPCH4 25 for Annex 4

Table A: Inputs for the BE spreadsheets (white cells row 20 to 25 and 30)

Year	Processed (Annex 1)	Percent of 14,875	Percent Waste Type (Annex 2) A	B	C	D	E	A to E
2008	1,490.000	10.017%	5.051	5.756	7.416	0.000	81.777	100.000
2009	7,187.000	48.316%	5.051	5.756	7.416	0.000	81.777	100.000
2010	10,312.308	69.326%	4.613	4.237	8.225	0.125	82.800	100.000
2011	13,861.651	93.188%	4.675	3.987	9.119	0.313	81.906	100.000
2012	9,917.502	66.672%	4.400	3.500	12.100	0.213	79.788	100.001
2013	8,358.592	56.192%	5.667	4.014	8.042	0.611	81.667	100.000
2014	11,787.523	79.244%	6.183	4.067	9.225	0.1833	80.342	100.000
2015		0.000%						0.000
2016		0.000%						0.000
2017		0.000%						0.000
2018		0.000%						0.000

Table B: Results from the BE spreadsheets in tons of CO_2e (from cells in row 46)

	2008 CO_2e	2009 CO_2e	2010 CO_2e	2011 CO_2e	2012 CO_2e	2013 CO_2e	2014 CO_2e	2015 CO_2e	2016 CO_2e	2017 CO_2e	2018 CO_2e
2008	236.859	196.777	164.441	138.127	116.552	117.554	99.961	85.289	73.004	62.680	53.978
2009		1,142.465	949.133	793.165	666.244	669.258	567.011	482.152	411.385	352.127	302.330
2010			1,653.026	1,367.656	1,138.469	1,134.199	953.567	804.997	682.076	579.864	494.509
2011				2,231.371	1,840.807	1,819.798	1,519.868	1,275.744	1,075.567	910.376	773.312
2012					1,627.627	1,582.909	1,303.461	1,080.857	901.740	756.325	637.346
2013						1,581.489	1,310.071	1,091.951	915.068	770.485	651.491
2014							2,243.852	1,852.105	1,539.290	1,287.030	1,081.823
2015											
2016											
2017											
2018											
Total:	**236.859**	**1,339.242**	**2,766.600**	**4,530.320**	**5,389.699**	**6,905.207**	**7,997.791**	**6,673.094**	**5,598.129**	**4,718.888**	**3,994.789**
From Table 13:	$GWPCH_4$ for 2008 to 2012: 21					$GWPCH_4$ for 2013 to 2018: 25					

Note to Table A:

The highlighted values above must be inserted for each year separately (other years = 0) into the respective BE spreadsheet.

The CO2e values resulting from the BE spreadsheets (highlighted cells in row 46) are then entered into Table B.

The BE spreadsheet is available from the PA's CDM website: http://cdm.unfccc.int/UserManagement/FileStorage/7OXD4P48Q7CKOWOQAU9CK89E4H4T5V

The BE spreadsheet (excerpt for 2014 in Annex 3 and workable spreadsheets 2008 to 2014 available to the DOE) is based on processing yearly 14,875 tons of organic waste into compost (Cell D3). Any yearly deviation from this amount is adjusted in the spreadsheet by inserting the percentage of actual tons processed in percent of 14,875 tons into row 30 "Deposition trend" of the respective year. All other years must remain zero, because the BE spreadsheet cannot handle different yearly waste type percentages. This requires a BE baseline spreadsheet for each year. Also separate BE spreadsheets are necessary for the commitment period up to 2012 and after 2012, because the Global Warming Potential for methane ($GWPCH_4$) has been increased from 21 to 25. The yearly CO_2e values in row 46 from actual year onwards to the right are then copied into the spreadsheet of above Table B.

Because each year requires its individual BE spreadsheets, no values are shown for other year. As a consequence, " #Div/0! " appear in the workable spreadsheets in cells from row 47 on downwards.

Annex 5: Summary of project energy consumption 2014

Copied from spreadsheet: Details of total energy consumption 2014 for Annex 5

Total Year 2014	**Electric Consumption** in kWh	**Transport Diesel Consumption** in liters	**On-site Diesel Consumption** in liters	**Gasoline Consumtion** in liters
January	1,005.10	126.82	1,045.80	0
February	2,010.20	190.89	949.50	0
March	2,010.20	145.08	1,387.26	0
April	2,010.60	217.84	529.14	0
May	2,010.60	126.46	1,349.28	0
June	3,015.90	199.72	1,355.96	0
July	2,010.40	108.84	926.36	0
August	1,005.30	127.12	612.84	0
September	2,510.90	199.72	1,453.78	0
October	2,005.70	145.26	567.04	0
November	2,010.40	171.33	1,040.82	0
December	3,015.30	79.93	922.50	0
Total	**24,620.60**	**1,839.01**	**12,140.28**	**0**

For reported electric power consumption refer to Table 20 and 28
(above values only indicative based on receipts of prepaid kWh units)

Annex 6: Summary of transport emissions 2014

Copied from spreadsheet: Details of sales –transport emission 2014 for Annex 6

1. Compost Delivery by Facility

Compost sold and delivered by facility	kg	404,750.0
	tons	404.750
Deliveries by facility	transports	88

2. Compost Pickup by Customers

Compost sold and pickedup by customer	kg	764,696.4
	tons	764.696
Pick ups by customer	pick ups	176

3. Compost sold to BioTek

	kg	428,700.0
	tons	428.700
Used on site (see note below)	transactions	23

4. Data used in Tables 21, 22, 23 and 32

Total compost sold = Q_{comp}	in kg	1,598,146.4
	in tons	1,598.146
(for use in Table 21 and 32)		
Share of compost picked up = S_{comp}	**ratio**	**0.4785**
(for use in Table 22 and 32)		(= 765.696 : 1,598.146)
Average weight in tons per pick-up = CT_{comp}	**tons**	**1.317**
(for use in Table 23 and 32)		(= 765.696 : 176)

Note: BioTek is a company that is located on the same premises as the project activity. They process our compost with other material to fertilizer pellets. Our compost makes up about 30% in their formula. As they are located on-site, no compost transport ensues.

Annex 7: Calibration of weighing scales and kW-meter 2014

Weighing scales are calibrated according to Operating Procedure OP 22
Calibration frequency: annually for weighing scales, 5 years for kW-Meter
All calibrations wre performed by the governmental UPT Metrologi, Bali

Equipment	Brand and model	Specification	Serial No.	Calibration dates
Digital balance	AND AD 4406	1000 kg / 0.2 kg	P3507372	27-Mar-08 10-Jun-08 18-Feb-09 17-Feb-10 10-Feb-11 9-Feb-12 9-Feb-13 7-Feb-14
Analog balance	Pertis sentisimal	300 kg / 0.1 kg	B 040704	21-Jul-09 17-Feb-10 10-Feb-11 9-Feb-12 9-Feb-13 7-Feb-14
Analog balance	Pertis sentisimal	300 kg / 0.1 kg	B 070494	21-Jul-09 17-Feb-10 10-Feb-11 9-Feb-12 9-Feb-13 7-Feb-14
Analog balance	Pertis sentisimal	300 kg / 0.1 kg	B 1102217	24-Sep-12 9-Feb-13 7-Feb-14
Analog balance	KM sentisimal	300 kg / 0.1 kg	B 910007	9-Feb-12 9-Feb-13 7-Feb-14
Analog balance	Radjin sentisimal	300 kg / 0.1 kg	110967	9-Feb-12 9-Feb-13 7-Feb-14
Digital balance	KRIS EK3550	5000 g / 1 g	none available	20-Mar-12 20-Mar-13 7-Feb-14
Digital balance	Ohaus Scout	200 g / 10 mg	7129350044	3-Sep-10 9-Feb-12 9-Feb-13 7-Feb-14
kW-Meter	Hexing SGC:901129 Accuracy class:	3 Phase 33 kW Cl.1 (see meter)	14070367744	14-Dec-12
In use since 14 Dec 2012		Recalibration November 2017 (no day available from UPT Metrologi)		

Annex 8: Index of the Operating Procedures of the Quality System

Section	Topic
Quality System Related Operating Procedures	
OP 01	Index
OP 02	empty
OP 03	Document Control
OP 04	Procedure Writing
OP 05	Management Review
OP 06	Internal Quality Audits
OP 07	Quality Record Storage
OP 08	Computer Security
Production Related Operating Procedures	
OP 09	Waste Separation
OP 10	Weight Control
OP 11	Raw Compost Production
OP 12	Finished Compost Production
OP 13	Speciality Compost Production
OP 14	Sieving of Compost
OP 15	Product Identification
OP 16	Compost Storage
OP 17	Compost Production Monitoring
OP 18	Compost Quality Control
OP 19	Packaging and Delivery
OP 20	empty
OP 21	Maintenance
OP 22	Calibrated Equipment
OP 23	Staff Training
OP 24	Staff Safety
OP 25	Staff Health
OP 26	Environmental Control
OP 27	Non-Conformities
OP 28	Quality Alerts
OP 29	empty
Sales Related Operating Procedures	
OP 30	Sales Control
OP 31	Customer Support
OP 32	Customer Complaints
OP 33	Administration and Accounting
OP 34	empty
CDM Related Operating Procedures	
OP 35	CDM Monitoring Management
OP 36	CDM Monitoring Process
OP 37	CDM Data Recording and Storage
OP 38	CDM Quality Control Procedures
OP 39	CDM Report Compilation and Verification

Annex 9: Summary of BE, PE and ER 2014

Copied from spreadsheet: Details of BE, PE calculation 2014 for Annex 9

	Source	Total CO_2e 2014	For MR 2014
1. Details on emission reductions			
ER from processing and subsequent year	Table 27	7,997.791	
Adjustment for prior activities	Table 35/36	399.460	
Total		**7,598.331**	
2. Details on project emissions			
Facility power (PE power)	Table 28/29	37.271	
Facility diesel (PE diesel, gasoline)	Table 30/31	37.239	
Transport diesel (PE transport)	Table 32	9.592	
Total PE Project	Table 34	**84.101**	**85**
3. Total leakage			
Leakage (L)	E.3.	0	**0**
4. Emission reductions in year y (before adjustment for volumes processed in the baseline case)			
Equation 8 of PDD: ERy = BEy – PEy – Ly			
Gross baseline emission	Table 27	7,997.79	
Total project emission	Table 33	84.10	
Leakage	E.3.	0	
Emission reduction due to project activity	Table 34	7,913.69	
5. Adjustment of baseline emission due to prior pilot plant activity			
5.1. Adjustment factor r			
Equation 10 of PDD: r = $WCOM_{BAU}$ / $TWCO_{My}$			
Prior activity WCOMBAU	Table 35	595.000	
Project activity WCOMMY	Table 35	11,787.523	
Adjustment factor r	Table 35	0.05048	
Adjustment factor (1 - r)	Table 35	0.94952	
5.2. Adjustment for gross baseline emission due to prior project activity in pilot plant			
Equation 9 of PDD: ERy = ERy * (1 - r)			
Gross emission reduction due to project activity	Table 34	7,913.690	
Adjustment factor (1 - r)	Table 35	0.94952	
Net emissions reduction due to project activity		7,514.230	
Adjustments to gross baseline emission		399.460	
5.3. Adjustment to gross baseline emission for the prior project activity in the pilot plant			
Gross baseline emission	Table 27	7,997.791	
Adjustment due to prior activity in pilot plant	Table 36	399.460	
Net baseline reduction	**Table 37**	**7,598.331**	**7598**
Calculation basis for project emissions per year:			
Facility power (MWh)	Table 28	51.196	
Facility equipment and truck diesel (liter)	Table 30	13,979.3	
Compost sold (tons)	Table 32	1,598.1	
Organics processed (tons)	Table 25	11,787.523	