Gianyar Waste Recovery Project

CDM Monitoring Report for Initial Verification

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Annexes

A. INFORMATION ABOUT THE SMALL SCALE PROJECT ACTIVITY

A.1. Title of the project activity

Gianyar Waste Recovery Project

A.2. Project location

Temesi, Gianyar
Bali 80551, Indonesia

Longitude: E 115º 20' 59"
Latitude: S 8º 33' 58"
(new by GPS)

A.3. Project contact

Responsible for Monitoring Report: David Küper, CDM Management Advisor
Tel. +62 (0)81 24 66 22 50 dkuper@indo.net.id

A.4. Methodology

Project activity:

- Sector 13 Waste handling and disposal.

Type and category in accordance with Annex B[1] to the simplified modalities and procedures for small-scale CDM project activities:

- Type III – Other project activities
- Category III.F. – avoidance of methane production from biomass decay through composting, version 05

A.5. CDM registration

Registration Number UNFCCC 1885, dated November 4, 2008

UNFCCC website: http://cdm.unfccc.int/Projects/DB/SGS-UKL1214472977.27/view
Project website: http://temesirecycling.org

A.6. Crediting period

10 years starting November 4, 2008.

A.7. Monitoring period

November 4, 2008 to April 30, 2010

A.8. Implementation status

The project was implemented before the beginning of the crediting period, although until the end of 2009 only with half of the planned processing capacity.

A.9. Changes since registration or validation

No requests for changes or revisions of the PDD or validation were made. However, a change of the Modalities of Communication is still pending.

A.10. Short project description

Bali, like the rest Indonesia, suffers from increasing amounts of waste that pollutes the environment. The Rotary Club of Bali Ubud has addressed this problem and built a model waste recovery facility with a processing capacity of 60 tons per day that can easily be replicated elsewhere in Indonesia. It was supported by Rotary International, the Swiss and Canadian Governments as well as the United Nations Environment Programme and other donors like the tour operator Kuoni.

The project started in 2004 with a 400 m^2 pilot plant with a capacity of maximum 3 tons per day to establish all parameters needed to later build a large scale waste recovery facility. In June 2008, the first phase of such a large scale facility with a capacity to process 30 tons of waste per day was completed. In December 2009, a capacity extension to 60 tons under a 4740 m^2 roof concluded the project. This makes Gianyar probably the first regency in Indonesia that processes most collected waste. Also, 120 new jobs were created.

The goal of this pioneering project was the construction of a sustainable model facility for solid waste management and a cleaner environment. The low cost, low tech and low risk approach is easy to replicate. Aerobic composting with forced aeration avoids the strong greenhouse gas methane that otherwise would be generated in anaerobic landfills. This allowed the project to be registered under the CDM. Non-organic waste is recycled.

The project received in 2008 a prestigious recognition from the United Nation Environment Programme by being placed first of 13 SHOWCASE PROJECTS that were selected from hundreds of projects in the Asia-Pacific region. In 2006, the President of Indonesia awarded the ADIPURA trophy for Environmental Waste Management.

To improve the value of frequent visits of schools, government officials, NGOs and other interested parties, the redundant 400 m^2 pilot plant was transformed into the indoor section of an educational park. Together with an outdoor section, it focuses on climate change, solid and liquid waste.

Results: An innovative low cost, low tech and low risk model for decentralized and environmentally friendly solid waste processing, which can easily be replicated elsewhere.

The facility and the educational park were built on top of the former 8 meter deep landfill. The elimination of the emissions made the project welcomed by the population.

Project pictures:

Waste separation

Composting with blowers

Environmental park

A.11. Project baseline

The baseline of this project activity has been developed by following strictly the guidelines and rules defined in the respective methodologies and tools (see section B.1. of the PDD).

The baseline scenario is the continued dumping of the waste on the existing landfill site in the absence of the project activity. The resulting baseline emissions are calculated based on the First Order Decay model (FOD) as required by the methodology. The formula and its parameters are explained in detail in section B.6. of the PDD. For most of the parameters the IPCC default values or recommendations given in the methodology have been followed, since no location or region specific information is available. Where required and available project specific data and information from the plant operator is used.

A. 12. Project activity

The technology used and measures applied in this project activity is to avoid the production of methane from the biomass fraction of municipal waste that would have otherwise 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. QUALITY ASSURANCE AND QUALITY CONTROL MEASURES

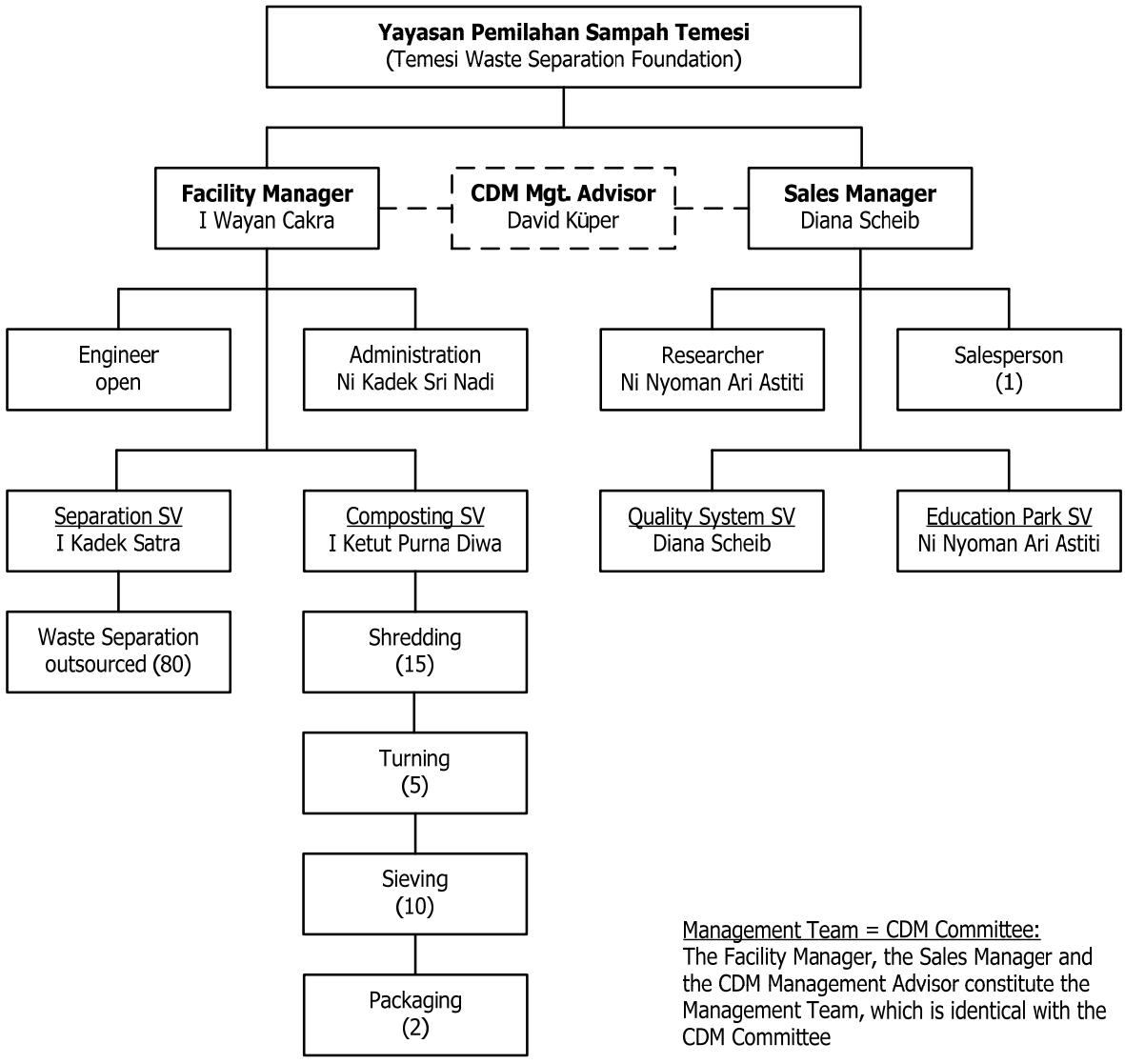
The facility management has introduced a Quality System, designed similar to ISO 9000. This unregistered Quality System has three hierarchical levels. The first of these levels is the Quality Manual. The second level is Operating Procedures. The Operating Procedures document the activities which are carried out to achieve the necessary level of quality of our products and services, including CDM related issues. They also define how quality records are maintained to provide evidence of control of the system. As third level, Work Instructions can be issued, when further detail is required.

C. MONITORING ACTIVITIES

C.1. Monitoring management

The organization chart shows the persons in charge for the tasks described. In view of the individual capabilities, the function of Sales Manager is on the same hierarchical level as the Facility Manager.

Table 1: Organization Chart:



All CDM related responsibilities are covered in the Quality System that is implemented under the Facility Manager and Sales Manager. 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.2. 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.

C.2.1. Waste measurement and project emissions

The Operating Procedures for the measurement and recording of quantity waste processed, waste composition, energy consumption, transport emission are referred to in the related sections of chapter D. Calculation of GHG emission reductions.

C.2.2. Other parameters required by the methodology

Other parameters are determined according to the following Operating Procedures:

- Monitoring the composting process is covered in OP 11 Raw Compost Production, OP 12 Finished Compost Production, OP 13 Specialty Compost Production and OP 17 Compost Production Monitoring.
- Analyzing 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 is verifiable on site.

C.3. Data recording and archiving

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

C.4. 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 balances used to weigh the organic waste that is composted. The calibration of the weighing scales 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 6.

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.5. 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.

D. CALCULATION OF GHG EMISSION REDUCTIONS

D.1. Calculation of baseline emissions

As described in section B.6.1 of the PDD, the baseline emissions are calculated based on the 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 - ER Spreadsheet or directly from:
http://cdm.unfccc.int/UserManagement/FileStorage/7OXD4P48Q7CKOWOQAU9CK89E4H4T5V
This ER Spreadsheet allows scenario calculations by changing the input of the various parameters to represent the actual project activity during the monitoring period, like tons actually processed and waste types.

D.1.1. Actual amount of organic waste processed per monitoring year

The ER Spreadsheet is fixed on processing yearly 14,785 tons of organic waste into compost (Cell D3). Any yearly variations from this amount are adjusted of the spreadsheet by inserting the percentage of actual tons in percent of the 14,875 tons into the respective year of row 30 "Deposition trend". The actual tons per year were measured according to OP 05 Weight Control.

Table 2: Actual amount of organic waste processed in percent of planned amount as inserted into Cell C30 to E30 of the ER Spreadsheet

Organic waste processed (W_y)	**2008** Nov 4 to Dec 31	**2009** Jan 1 to Dec 31	**2010** Jan 1 to Apr 30
Total of all waste types in tons	1,490	7,509	5,131
In percentage of the planned amount of 14,875 tons	**10.0 %**	**50.5 %**	**34.5 %**

Source: Annex 3 Organic waste processed 2008, 2009 and 2010

Of the two methods possible according to the PDD, the project has chosen to determine the actual weight of compostable organic waste after the waste separation on calibrated weighing scales according to OP 05 Weight Control. The inert material is separated before weighing the organic waste and therefore not accounted for in the calculation.

D.1.2. Actual percentage of waste types per monitoring year (W_j)

The methodology distinguishes between five types of waste. Table 3 below shows the measured amounts of organic waste type per 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.

Table 3: Percentage of waste types as inserted into Cells D20 to D24 of the ER Spreadsheet

Waste types (j_y)	**PDD**	**Average Project**
A. Wood, wood products	3.0 %	**4.7 %**
B. Pulp, paper and cardboard	0.5 %	**5.1 %**
C. Food, food waste, beverages and tobacco	3.0 %	**6.1 %**
D. Textiles	0.5 %	**0.0 %**
E. Garden, yard and park waste	93.0 %	**84.1 %**
Total organic waste	100.0 %	100.0 %

Source: Annex 4 Percentage of waste types

D.1.3. Other parameters

All default parameters are used as indicated in section B.6.2. of the PDD.

D.1.4. Total baseline emissions

The total baseline emissions are calculated by inserting the data from Table 2 and 3 into the ER Spreadsheet. Segments of the ER Spreadsheet are shown in Annex 1 and 2.

Table 4: Total baseline emissions from ER Spreadsheet in Annex 1 and 2

Total baseline emissions (BE_y)	**tons CO2e**
Emissions Nov 4 to Dec 31, 2008 (source: Annex 1: Cell C46)	**235**
Emissions Jan 1 to Dec 31, 2009 (source: Annex 1: Cell D46)	**1,791**
Gross emissions Jan 1 to Apr 30, 2010 (source: Annex 1: Cell 46) - Deduction for 8/12 months of 1,155 (source Annex 2: Cell E46) = Net emissions Jan 1 to Apr 30, 2010	1,967 - 770 **1,197**
Total baseline emissions 2008, 2009 and 2010	**3,223**

See Notes in Annex 2 for more details about the 8/12 deduction of 770 t CO2e in 2010

The total baseline emission amount to: 3,223 tons CO2e.

D.2. Calculation of project emissions

To calculate the project emissions, the yearly consumptions from Nov 4, 2008 to Apr 30, 2010 were added up and then used to calculate the total project emissions.

D.2.1. Calculation of emissions from transport ($PE_{transport}$)

Transport emissions are determined monthly according to OP 36 CDM Monitoring Process.

Table 5: Total transport diesel consumption

Transport emissions	**2008** Nov 4 to Dec 31	**2009** Jan 1 to Dec 31	**2010** Jan 1 to Apr 30	**Total**
Liters of diesel	90	900	360	**1,350**

Source: Annex 5 (very generous estimate by CDM Management Advisor in OP 36-2 for 2008, 2009 and 2010)

Table 6: Total transport diesel emissions

Parameter	**Description**	**Unit**	**Value**
F_{diesel}	Diesel consumption from on-site consumption	liter	1,350
D_{diesel}	Density of diesel (ICPP)	kg/l	0.83
F_{diesel}	Diesel consumption from on-site consumption	tons	1.121
NCV_{diesel}	Net caloric value of diesel fuel (ICPP)	GJ/t	43.33
EF_{diesel}	CO2 emissions factor for diesel (ICPP)	t CO2/TJ	74.07
PE_{diesel}	**Emission from on-site diesel consumption**	**t CO2e**	**3.60**

Formula: F * NCV/1000 * EF (source of formula: PDD page 25, Table 6)

D.2.2. Calculation of emissions from power consumption (PE_{power})

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

Table 7: Total of on-site power consumption

Power consumption	**2008** Nov 4 to Dec 31	**2009** Jan 1 to Dec 31	**2010** Jan 1 to Apr 30	**Total**
kWh	4,059	24,422	5,101	**33,582**

Source: Annex 5

Table 8: Total on-site power emission

Parameter	**Description**	**Unit**	**Value**
EL	Power consumption	kWh	33,582
EF_{grid}	Emission factor of the Java–Madura–Bali grid	t CO2/MWh	0.728
PE_{power}	**Emission from power consumption**	**t CO2e**	**24.45**

Formula: EL * EF / 1000 (source of formula: PDD page 25, Table 5)

D.2.3. Calculation of emission from on-site fuel consumption (PE_{fuel})

The on-site fuel consumption is determined monthly according to OP 36 CDM Monitoring Process.

Table 9: Total on-site diesel consumption

On-site diesel consumption	**2008** Nov 4 to Dec 31	**2009** Jan 1 to Dec 31	**2010** Jan 1 to Apr 30	**Total**
Liters of diesel	1,051	7,767	1,480	**10,298**

Source: Annex 5
Note: The fraction of organic waste shredded was drastically reduced in 2010 to reduce diesel consumption and thus operating expenses

Table 10: Total on-site diesel emissions

Parameter	**Description**	**Unit**	**Value**
F_{diesel}	Diesel consumption from on-site consumption	liter	10,298
D_{diesel}	Density of diesel (ICPP)	kg/l	0.83
F_{diesel}	Diesel consumption from on-site consumption	tons	8.547
NCV_{diesel}	Net caloric value of diesel fuel (ICPP)	GJ/t	43.33
EF_{diesel}	CO2 emissions factor for diesel (ICPP)	t CO2/TJ	74.07
PE_{diesel}	**Emission from on-site diesel consumption**	**t CO2e**	**27.43**

Formula: F * NCV/1000 * EF (source of formula: PDD page 25, Table 6)

D.2.4. Calculation of leakage (L)

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 CO2e

D.2.5. Summary of project emissions

Table 11: Calculation of total project emissions

Description	**CO2e**
Total emissions from transport ($PE_{transport}$)	4
Total emissions from total power consumption (PE_{power})	25
Total emission from on-site fuel consumption (PE_{fuel})	27
Total emission from leakage (L)	0
Total project emissions	**56**

Source: Table 6, 8 and 10

The total project emission amount to: 56 tons CO2e.

D.3. Overall emission reductions

D.3.1. Calculation of adjustment factor (r)

The baseline emissions must be reduced by volumes (r) already processed in the in the baseline case. This applies to volumes processed prior to the project in the pilot plant, which processed 595 tons of organic waste per year (PDD page 19 and 26).

Table 12: Calculation of average adjustment factor r

Total waste processed	**2008** Nov 4 to Dec 31	**2009** Jan 1 to Dec 31	**2010** Jan 1 to Apr 30	**Total**
Project activity	1,490	7,509	5,131	14,130
Prior activity: - Fraction of year - Fraction of 595 t/yr	 2/12 99	 12/12 595	 4/12 198	 892
Average factor r				**0.063**

Source: Table 2 and PDD page 19
Formula: Prior activity / Project activity

D.3.2. Calculation of project emission reductions

Table 14: Calculation of project emission reductions

Year	**Baseline emission**	**Project emissions**	**Leakage**	**Adjustment by 1-r:** 1-0.063=0.937	**Overall emission reductions**
	t CO2e	t CO2e	t CO2e		t CO2e
Total	**3,223**	**56**	**0**	**0.937**	**2,967**

Source: Table 4, 11 and 12

The total project emission reductions amount to: 2,967 tons CO2e.

Annex 1: Adjusted segment of ER Spreadsheet 2008 to 2010

	A	B	C	D	E
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		21	
14	Oxidation factor	OX		0.0	
15	Fraction of methane in LFG	F		0.5	
16	Fraction of degradable organic carbon	DOCf		0.5	
17	Mass ratio CH4:C	16/12		1.33	
18	Methane correction factor	MCF		0.8	
19	Waste stream				
20	Wood and wood products	A	%	4.7%	
21	Pulp, paper and cardboard	B	%	5.1%	
22	Food, food waste, beverages and tobacco	C	%	6.1%	
23	Textiles	D	%	0.0%	
24	Garden, yard and park waste	E	%	84.1%	
25	Glass, plastic, metal other inert	F	%	0.0%	
26	Total		%	100.0%	
27					
28	**Calculations**				
29			2008	2009	2010
30	Deposition trend:		10.0%	50.5%	34.5%
31	**Year**		**1**	**2**	**3**
32	**Waste deposition**				
33	Wood and wood products	t / year	69.91	353.06	241.20
34	Pulp, paper and cardboard	t / year	75.86	383.11	261.73
35	Food, food waste, beverages and tobacco	t / year	90.74	458.22	313.04
36	Textiles	t / year	0.00	0.00	0.00
37	Garden, yard and park waste	t / year	1,250.99	6,317.49	4,315.91
38	Waste deposition total	t / year	1,487.50	7,511.88	5,131.88
39	Waste deposition (cumulative)	t	1,487.50	8,999.38	14,131.25
40	**Methane emissions**				
41	Wood and wood products	t CO2e/yr	5	31	48
42	Pulp, paper and cardboard	t CO2e/yr	10	62	93
43	Food, food waste, beverages and tobacco	t CO2e/yr	23	129	165
44	Textiles	t CO2e/yr	0	0	0
45	Garden, yard and park waste	t CO2e/yr	197	1,162	1,660
46	Methane emissions total	t CO2e/yr	235	1,384	1,967

Annex 1 is a segment of the ER Spreadsheet that shows most of the relevant data. The Annex 1 and 2 segments contain only values and no formulas (the downloadable ER Spreadsheet must be used for computations):

- In Cells D20 to D24, the percentage of waste types from Table 3 has been entered.
- In Cells C30 to E30, the "Deposition trend" from Table 2 has been entered.
- In Cells C46 to E46, the total methane emissions for the years 2008, 2009 and 2010 are calculated and were entered into Table 4.
- However, the value in Cell E46 contains also FOD emissions that were generated by waste deposited in 2008 and 2009 for all 12 months of 2010. The calculation of the deduction for the monitoring period of only 4 months in 2010 is shown in Annex 2.

Annex 2: Adjusted segment of ER Spreadsheet 2008 to 2009

	A	B	C	D	E
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		21	
14	Oxidation factor	OX		0.0	
15	Fraction of methane in LFG	F		0.5	
16	Fraction of degradable organic carbon	DOCf		0.5	
17	Mass ratio CH4:C	16/12		1.33	
18	Methane correction factor	MCF		0.8	
19	Waste stream				
20	Wood and wood products	A	%	4.7%	
21	Pulp, paper and cardboard	B	%	5.1%	
22	Food, food waste, beverages and tobacco	C	%	6.1%	
23	Textiles	D	%	0.0%	
24	Garden, yard and park waste	E	%	84.1%	
25	Glass, plastic, metal other inert	F	%	0.0%	
26	Total		%	100.0%	
27					
28	**Calculations**				
29			2008	2009	2010
30	Deposition trend:		10.0%	50.5%	0.0%
31	**Year**		**1**	**2**	**3**
32	**Waste deposition**				
33	Wood and wood products	t / year	69.91	353.06	0.00
34	Pulp, paper and cardboard	t / year	75.86	383.11	0.00
35	Food, food waste, beverages and tobacco	t / year	90.74	458.22	0.00
36	Textiles	t / year	0.00	0.00	0.00
37	Garden, yard and park waste	t / year	1,250.99	6,317.49	0.00
38	Waste deposition total	t / year	1,487.50	7,511.88	0.00
39	Waste deposition (cumulative)	t	1,487.50	8,999.38	8,999.38
40	**Methane emissions**				
41	Wood and wood products	t CO2e/yr	5	31	30
42	Pulp, paper and cardboard	t CO2e/yr	10	62	58
43	Food, food waste, beverages and tobacco	t CO2e/yr	23	129	87
44	Textiles	t CO2e/yr	0	0	0
45	Garden, yard and park waste	t CO2e/yr	197	1,162	980
46	Methane emissions total	t CO2e/yr	235	1,384	1,155

Annex 2 is used to calculate the pro rata deduction in 2010 for FOD emissions that were generated by waste deposited in 2008 and 2009, because the monitoring for 2010 comprises only 4 months:

- Because the "Deposition trend" in E 30 has been set to 0 %, the value in Cell E46 shows only the FOD emissions resulting only from waste deposited in 2008 and 2009.
- However the 1,155 t CO2e shown in Cell E46 are for the whole 12 months of 2010.
- Because the monitoring period in 2010 comprises only 4 months, 770 t of CO2e for 8 months must be deducted in Table 4 (8/12 of 1,155 = 770).

Annex 3: Organic waste processed 2008 to 2010

TOTAL ORGANIC WEIGHT (KG) JANUARY TO DECEMBER 2008

Date	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	126,290.9	0.0	0.0	0.0	0.0	1,354.5	0.0	10,048.8	21,554.3	26,832.1	11,364.0	30,422.0	24,715.2
2	124,943.2	0.0	0.0	0.0	0.0	1,887.5	4,807.5	10,377.7	20,363.7	25,613.1	10,071.0	29,015.4	22,807.3
3	106,652.5	0.0	0.0	0.0	0.0	10,036.0	6,524.0	10,465.5	0.0	25,030.0	12,152.0	20,266.0	22,179.0
4	119,393.3	0.0	0.0	0.0	0.0	0.0	5,792.2	13,338.5	21,458.4	21,452.7	10,318.0	24,592.0	22,441.5
5	132,152.2	0.0	0.0	0.0	0.0	10,350.0	6,402.6	13,087.3	21,353.7	19,495.2	11,734.0	26,325.0	23,404.4
6	117,938.5	0.0	0.0	0.0	0.0	311.0	3,731.5	0.0	22,486.5	21,845.9	10,964.0	29,591.0	29,008.6
7	122,103.4	0.0	0.0	0.0	0.0	9,401.5	1,139.3	14,873.3	24,887.3	16,632.6	10,601.0	24,511.0	20,057.4
8	113,981.6	0.0	0.0	0.0	0.0	675.5	0.0	12,012.9	26,597.4	20,590.8	8,936.0	23,630.0	21,539.0
9	123,229.9	0.0	0.0	0.0	0.0	9,854.0	5,404.4	0.0	27,350.3	19,200.7	17,864.0	22,089.0	21,467.5
10	105,879.4	0.0	0.0	0.0	0.0	2,010.5	5,761.3	11,906.8	0.0	16,114.1	16,721.0	23,457.0	29,908.7
11	142,351.6	0.0	0.0	0.0	0.0	8,000.0	5,513.1	13,831.0	27,960.6	17,307.9	14,030.0	28,249.0	27,460.0
12	121,310.9	0.0	0.0	0.0	0.0	5,310.5	6,926.0	14,699.6	26,088.2	18,191.2	14,333.0	21,445.0	14,317.4
13	132,010.2	0.0	0.0	0.0	0.0	8,882.5	5,310.2	0.0	26,150.7	19,912.6	19,750.0	26,423.0	25,581.2
14	136,814.1	0.0	0.0	0.0	0.0	10,512.0	4,221.4	14,143.0	27,340.3	12,763.5	16,987.5	26,861.2	23,985.2
15	124,304.3	0.0	0.0	0.0	0.0	5,535.5	0.0	12,438.5	20,458.8	17,407.9	22,780.0	21,764.1	23,919.5
16	147,057.2	0.0	0.0	0.0	0.0	8,944.5	10,342.0	13,926.4	24,271.7	20,477.0	23,315.0	20,020.4	25,760.2
17	106,993.4	0.0	0.0	0.0	0.0	0.0	4,492.3	12,214.1	0.0	19,529.0	23,334.0	22,359.0	25,065.0
18	144,017.1	0.0	0.0	0.0	0.0	0.0	9,864.2	14,266.4	21,401.6	17,880.5	23,346.0	26,283.4	30,975.0
19	137,233.1	0.0	0.0	0.0	0.0	10,136.5	4,905.8	11,385.7	17,251.5	20,620.0	21,891.0	25,986.4	25,056.2
20	101,212.3	0.0	0.0	0.0	0.0	2,323.5	6,155.5	0.0	0.0	12,917.0	26,406.0	28,197.8	25,212.5
21	124,462.4	0.0	0.0	0.0	0.0	10,190.0	0.0	13,830.5	15,241.5	10,240.0	21,261.0	29,014.7	24,684.7
22	138,162.5	0.0	0.0	0.0	0.0	1,895.0	0.0	13,249.6	19,524.4	13,009.5	26,056.0	38,797.2	25,630.8
23	148,267.3	0.0	0.0	0.0	0.0	10,805.0	9,844.4	12,658.1	22,894.5	15,890.0	28,475.0	21,974.2	25,726.1
24	134,422.9	0.0	0.0	0.0	0.0	2,782.0	8,046.4	13,913.0	0.0	17,755.0	23,274.0	39,043.3	29,609.2
25	149,218.3	0.0	0.0	0.0	0.0	4,000.0	6,893.9	12,699.4	23,230.3	15,849.0	29,325.0	28,876.2	28,344.5
26	147,109.4	0.0	0.0	0.0	0.0	5,011.1	8,098.4	15,904.4	23,052.9	16,877.0	20,298.0	27,889.7	29,977.9
27	137,238.4	0.0	0.0	0.0	0.0	14,844.1	8,999.5	0.0	17,312.4	13,402.0	22,831.0	37,467.2	22,382.2
28	134,536.4	0.0	0.0	0.0	0.0	9,862.5	8,299.8	14,632.5	17,473.5	11,770.0	31,403.0	20,673.4	20,421.7
29	128,771.5	0.0	0.0	0.0	0.0	10,367.6	0.0	12,319.0	16,489.9	11,987.0	27,225.0	30,243.0	20,140.0
30	132,982.4	0.0	0.0	0.0	0.0	2,233.1	7,784.6	12,393.2	13,609.9	14,592.0	25,369.0	27,560.6	29,440.0
31	78,471.3	0.0	0.0	0.0	0.0	0.0	0.0	14,219.6	14,831.0	0.0	24,170.0	0.0	25,250.7
TOTAL	**3,939,512**	**0**	**0**	**0**	**0**	**177,516**	**155,260**	**338,835**	**560,635**	**531,185**	**606,585**	**803,027**	**766,469**

TOTAL ORGANIC WEIGHT (KG) JANUARY TO DECEMBER 2009

Date	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	204,518.7	0.0	22,001.8	11,813.4	15,459.5	16,057.0	23,732.0	28,714.0	10,565.0	19,298.0	14,219.0	22,082.0	20,577.0
2	251,483.2	33,846.6	22,085.8	15,991.8	16,284.0	13,415.0	24,466.0	18,671.0	17,417.0	15,495.0	21,879.0	30,273.0	21,659.0
3	242,434.7	21,354.6	25,767.5	13,282.4	18,041.2	11,668.0	21,659.0	28,406.0	21,029.0	17,893.0	18,618.0	19,998.0	24,718.0
4	223,628.1	0.0	23,771.6	19,907.7	15,205.8	16,377.0	21,339.0	20,840.0	15,713.0	14,932.0	21,626.0	31,207.0	22,709.0
5	246,280.8	35,599.2	21,891.4	12,161.8	7,125.4	19,380.0	20,624.0	24,405.0	18,880.0	14,488.0	24,605.0	18,390.0	28,731.0
6	253,989.6	26,174.3	29,809.8	15,376.5	12,155.0	17,987.0	18,700.0	21,655.0	11,213.0	19,593.0	25,939.0	32,547.0	22,840.0
7	254,236.4	24,060.0	25,506.2	15,293.2	11,374.0	16,921.0	19,394.0	23,111.0	19,454.0	18,034.0	23,822.0	27,547.0	29,720.0
8	254,477.6	25,788.1	20,451.5	10,884.0	16,854.0	23,075.0	25,343.0	26,107.0	16,337.0	13,617.0	28,020.0	21,453.0	26,548.0
9	249,077.8	23,568.6	20,392.4	15,808.8	5,424.0	16,672.0	22,385.0	25,308.0	20,744.0	15,543.0	23,113.0	30,454.0	29,665.0
10	256,205.6	21,247.2	28,232.4	16,301.0	9,611.0	11,066.0	23,365.0	23,425.0	16,838.0	13,842.0	28,582.0	32,879.0	30,817.0
11	263,610.0	24,667.3	23,744.3	14,482.4	9,356.0	18,028.0	22,500.0	22,539.0	23,428.0	14,672.0	27,673.0	32,622.0	29,898.0
12	233,366.5	31,973.9	31,307.8	16,649.8	7,412.0	11,893.0	22,366.0	19,684.0	17,814.0	10,488.0	20,450.0	32,140.0	11,188.0
13	272,871.2	26,479.0	20,302.2	13,743.0	16,386.0	26,120.0	26,099.0	27,069.0	21,510.0	0.0	33,464.0	29,284.0	32,415.0
14	225,024.5	27,773.8	22,978.9	17,512.8	17,807.0	19,042.0	19,151.0	20,585.0	13,479.0	9,285.0	0.0	33,653.0	23,757.0
15	239,889.1	29,302.4	21,337.7	14,339.0	15,484.0	15,725.0	23,818.0	18,932.0	0.0	5,461.0	31,437.0	33,508.0	30,545.0
16	278,772.4	27,141.0	25,521.6	13,945.8	13,964.0	22,288.0	21,576.0	27,454.0	24,441.0	6,833.0	29,615.0	33,135.0	32,858.0
17	220,447.8	0.0	27,109.8	0.0	12,401.0	18,448.0	22,073.0	20,140.0	17,524.0	9,088.0	27,938.0	33,019.0	32,707.0
18	258,458.7	23,640.6	30,152.1	0.0	16,353.0	21,380.0	19,455.0	21,854.0	20,309.0	7,584.0	30,842.0	33,329.0	33,560.0
19	246,410.9	31,212.3	21,948.6	0.0	11,180.0	25,350.0	25,066.0	22,707.0	13,461.0	8,486.0	29,835.0	23,496.0	33,669.0
20	267,682.7	27,373.8	28,632.0	19,367.9	17,000.0	22,223.0	18,329.0	19,800.0	20,570.0	0.0	31,503.0	29,957.0	32,927.0
21	237,901.6	24,491.3	23,091.3	16,503.0	14,517.0	20,143.0	26,875.0	17,310.0	17,746.0	6,569.0	27,392.0	16,823.0	26,441.0
22	260,823.0	25,784.1	23,161.5	18,561.4	21,974.0	20,149.0	19,222.0	22,350.0	15,664.0	7,417.0	29,533.0	24,878.0	32,129.0
23	243,250.4	21,700.0	32,111.4	2,175.0	17,409.0	21,280.0	22,348.0	19,374.0	15,696.0	5,356.0	31,531.0	22,527.0	31,743.0
24	239,267.6	24,690.3	26,270.4	24,553.9	22,561.0	16,334.0	21,329.0	22,353.0	22,830.0	6,183.0	0.0	20,642.0	31,521.0
25	245,950.4	20,473.2	21,208.2	12,712.0	16,683.0	18,935.0	24,710.0	22,353.0	20,813.0	6,696.0	30,390.0	21,559.0	29,418.0
26	248,443.8	21,392.7	20,073.6	0.0	18,082.5	20,541.0	24,228.0	20,896.0	23,419.0	9,276.0	35,292.0	22,623.0	32,620.0
27	233,072.6	20,134.8	26,655.0	6,637.8	15,896.0	19,242.0	23,662.0	19,393.0	15,962.0	9,372.0	30,732.0	16,756.0	28,630.0
28	231,944.6	26,650.6	20,260.0	0.0	0.0	24,554.0	21,012.0	21,586.0	17,472.0	10,171.0	32,742.0	23,814.0	33,683.0
29	226,545.2	24,325.2	0.0	0.0	16,492.0	21,382.0	25,353.0	17,211.0	21,020.0	13,287.0	31,747.0	22,862.0	32,866.0
30	246,684.6	25,984.4	0.0	20,979.2	17,738.0	23,239.0	19,218.0	17,793.0	19,605.0	18,739.0	30,836.0	22,411.0	30,142.0
31	152,707.5	22,981.1	0.0	17,302.4	0.0	17,057.0	0.0	16,161.0	19,560.0	0.0	27,185.0	0.0	32,461.0
TOTAL	**7,509,458**	**719,810**	**685,777**	**376,286**	**426,229**	**585,971**	**669,397**	**678,186**	**550,513**	**327,698**	**800,560**	**795,868**	**893,162**

TOTAL ORGANIC WEIGHT (KG) JANUARY TO DECEMBER 2010

Date	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	124,309.0	0.0	40,937.0	44,978.0	38,394.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	187,160.0	59,392.0	45,364.0	44,537.0	37,867.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	164,021.0	41,947.0	42,901.0	40,188.0	38,985.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	172,894.0	49,893.0	45,706.0	40,383.0	36,912.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	172,020.0	42,622.0	52,055.0	38,500.0	38,843.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	173,889.0	42,455.0	47,562.0	42,391.0	41,481.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	179,661.0	46,473.0	52,410.0	41,763.0	39,015.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	172,535.0	45,907.0	44,949.0	38,500.0	43,179.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	184,262.0	44,916.0	49,708.0	45,291.0	44,347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	182,247.0	47,000.0	50,622.0	43,812.0	40,813.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	177,454.0	53,064.0	39,076.0	44,447.0	40,867.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	181,470.0	51,598.0	44,519.0	43,201.0	42,152.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	147,573.0	51,816.0	51,264.0	0.0	44,493.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	193,008.0	53,216.0	42,104.0	52,470.0	45,218.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	174,059.0	45,716.0	47,015.0	41,956.0	39,372.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	151,829.0	55,813.0	51,391.0	0.0	44,625.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	172,558.0	59,171.0	30,765.0	38,426.0	44,196.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	191,273.0	54,611.0	50,809.0	46,196.0	39,657.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	182,293.0	46,393.0	49,585.0	38,867.0	47,448.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	175,698.0	41,538.0	46,421.0	44,202.0	43,537.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	173,044.0	49,237.0	41,293.0	34,516.0	47,998.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	167,547.0	40,510.0	38,626.0	43,178.0	45,233.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	177,813.0	49,516.0	44,506.0	38,988.0	44,803.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	176,821.0	33,501.0	50,908.0	40,823.0	51,589.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	174,249.0	47,639.0	47,729.0	37,514.0	41,367.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	180,616.0	47,231.0	48,034.0	44,914.0	40,437.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	173,794.0	50,386.0	46,743.0	38,683.0	37,982.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	130,442.0	42,630.0	48,465.0	39,347.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	118,360.0	45,998.0	0.0	36,639.0	35,723.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	123,175.0	41,876.0	0.0	38,131.0	43,168.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	74,923.0	38,229.0	0.0	36,694.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	5,130,997	1,420,294	1,291,467	1,199,535	1,219,701	0	0	0	0	0	0	0	0

Annex 4: Percentage of waste types

			Organic waste for composting						Recyclables and residue		
Month	Year	Sample	A. Wood, wood products kg	B. Pulp, paper, cardboard kg	C. Food, food waste, beverages, tobacco kg	D. Textiles kg	E. Garden, yard, park waste kg	Sub-total organic waste kg	Recyclable material kg	Residue to landfill kg	Total waste kg
Waste types in percent of total waste											
January	2009	200 kg	6.3	10.2	14.2	0.0	140.1	170.8	21.4	7.8	200.0
April	2009	200 kg	9.0	9.7	10.7	0.0	132.6	162.0	24.7	13.3	200.0
Juli	2009	200 kg	12.0	12.6	12.7	0.0	135.6	172.9	16.7	10.4	200.0
October	2009	200 kg	7.1	6.7	12.9	0.0	148.6	175.3	12.9	11.8	200.0
January	2010	200 kg	6.1	4.8	5.6	0.0	161.9	178.4	10.3	11.3	200.0
April	2010	200 kg	8.2	8.3	6.7	0.0	150.2	173.4	15.6	11.0	200.0
Waste types in percent of total waste											
Total		kg	48.7	52.3	62.8	0.0	869.0	1,032.8	101.6	65.6	1,200.0
Total		Percent	4.1%	4.4%	5.2%	0.0%	72.4%	86.1%	8.5%	5.5%	100.0%
Waste types in percent of total organic waste:											
Total		kg	48.7	52.3	62.8	0.0	869.0	1,032.8			
Total		**Percent**	**4.7%**	**5.1%**	**6.1%**	**0.0%**	**84.1%**	**100.0%**			

Annex 5: Project emissions

Year	Electric Consumption in kWh	Transport Diesel Consumption in liters	On-site Diesel Consumption in liters	Gasoline Consumtion in liters
2008				
November	2050	45	435.9	0
December	2009	45	614.9	0
Total 2008	4059	90	1050.8	0
2009				
January	2046	75	663.6	0
February	2123	75	440	0
March	1892	75	420	0
April	2159	75	784.6	0
May	2110	75	1004.5	0
June	2154	75	620	0
July	2054	75	780	0
August	2023	75	742.2	0
September	2298	75	420	0
October	1513	75	772	0
November	2115	75	640	0
December	1935	75	480	0
Total 2009	24422	900	7766.9	0
2010				
January	1,875	90	540	0
February	1,491	90	340	0
March	622	90	600	0
April	1,113	90	0	0
Total 2010	5,101	360	1,480	0
Total Monitoring Period	**33,582**	**1,350**	**10,298**	**0**

Note: The transport diesel consumption is an expert judgment by the CDM Management Advisor in OP 36-2 for 2008, 2009 and 2010. The amounts are a generous estimate.

Annex 6: Calibration summary

Weighing scales, calibrated according to Operating Procedure OP 22

Calibration frequency: annually

Brand and model	Type	Specification	Serial No.	Calibration dates	Calibrated by
AND AD 4406	digital	1000 kg / 0.2 kg	P3807272	27 March 2008	Balai Metrologi, Jakarta
				10 June 2008	UPT Metrologi, Bali
				18 February 2009	UPT Metrologi, Bali
				17 February 2010	UPT Metrologi, Bali
Pertis sentisimal	analog	300 kg / 0.1 kg	B 040784	21 July 2009	UPT Metrologi, Bali
				17 February 2010	UPT Metrologi, Bali
Pertis sentisimal	analog	300 kg / 0.1 kg	B.U 70494	21 July 2009	UPT Metrologi, Bali
				17 February 2010	UPT Metrologi, Bali

The digital scale was used for weighing organic waste until mid-2009, when it was deemed that 2 smaller analog scales were more practical.

Annex 7: Index of 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