**Monitoring Report**

###### PUBLICATION DATE **14.10.2020** VERSION **v. 1.1** RELATED SUPPORT – [**TEMPLATE GUIDE Monitoring Report v. 1.1**](https://globalgoals.goldstandard.org/standards/TGuide-PerfCert_V1.1-Monitoring-Report.pdf)

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### KEY PROJECT INFORMATION

##### Key Project Information

|  |  |
| --- | --- |
| **GS ID (s) of Project (s)** | GS7561 |
| **Title of the project (s) covered by monitoring report** | Gianyar Waste Recovery Project |
| **Version number of the PDD/VPA-DD (s) applicable to this monitoring report** | 03.0 |
| **Version number of the monitoring report** | 02 |
| **Completion date of the monitoring report** | 18/04/2022 |
| **Date of project design certification** | 29/09/2020 |
| **Date of Last Annual Report** | 01/01/2021 |
| **Monitoring period number** | 02 |
| **Duration of this monitoring period** | 01/01/2021 to 31/12/2021 |
| **Project Representative** | Mr. Sean Nino Lotze |
| **Host Country** | Indonesia |
| **Activity Requirements applied** | Community Services Activities  Renewable Energy Activities  Land Use and Forestry Activities/Risks & Capacities  N/A |
| **Methodology (ies) applied and version number** | AMS-III.F.: Avoidance of methane emissions through composting, Version 12.0 |
| **Product Requirements applied** | GHG Emissions Reduction & Sequestration  Renewable Energy Label  N/A |

##### Table 1 - Sustainable Development Contributions Achieved

|  |  |  |  |
| --- | --- | --- | --- |
| Sustainable Development Goals Targeted | SDG Impact | Amount Achieved | Units/ Products |
| SDG 13 Climate Action | Emission Reductions | 7,797 | VERs |
| SDG 1 | No Poverty | 65 | 61 |
| SDG 3 | Good Health and Well Being | NA | NA |
| SDG 6 | Clean Water and Sanitation | NA | NA |
| SDG 11 | Sustainable Cities and Communities | 15,301 | 8,224 |

##### Table 2 – Product Vintages

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | **Amount Achieved** | | |
| **Start Dates** | **End Dates** | **Unit** | **Product VERs** | **aDALY** |
| 01/01/2021 | 31/12/2021 | Tons | 7,797 |  |
|  |  |  |  |  |
|  |  |  |  |  |

Emissions reduction from the project activity after adjustment, taken from Linked BE PE and ER tables for MR 2021; Formula: ER = (BE - PE - LE) \* (1 - r) ; Source: Tables 32, 42, 44, 45

1. DESCRIPTION OF PROJECT

**A.1.** **General description of project**

The project involves the implementation of a municipal solid waste processing unit in Temesi, Gianyar Region, Bali Province, Indonesia. A further objective is creating a large-scale model for waste processing in Indonesia. However, the facility with a capacity of 50 tons waste per day can process only a fraction of the waste created in the Gianyar region. The waste is processed through composting method and it was implemented in the two phases:

* 1st Phase: A 2340 m2 covered processing area with a capacity of maximum 30 tons waste per day- Commissioned on May 2008.
* 2nd Phase: A 2400 m2 extension to 4740 m2 for a final capacity of up to 50 tons waste per day-Commissioned January 2010.

As a first activity of composting, the waste separation is done by hand. The composting is equipped with air supply with the help of centrifugal blowers to assure the aerobic conditions. The waste is turned about every two weeks to loosen the material and free air supply. After the initial decomposition, the raw compost is sieved to separate fine compost and coarse materials. The fine compost is further aerated to get the finished compost. The coarse material is sent back to the incoming organic waste for further decomposition or treated separately for continued decomposition. Depending on demand, the sieved raw compost is sold exclusively for soil top-dressing applications or further cured to finished compost. The project activity maintains the oxygen level of at around 12% in the waste which is more than required of 6% to assure aerobic composting.

In the baseline condition, the waste would have dumped in the landfill which results in anaerobic decomposition and emits methane to atmosphere. Since, the project is aerobic decomposition of waste through composting, it avoids the generation of methane. Hence, the project avoids GHG emission.

The project is a registered CDM project and it has completed the CDM crediting period. The details of the CDM registration are given below:

|  |  |
| --- | --- |
| CDM Project Title | Gianyar Waste Recovery Project |
| UNFCCC Reference no | 1885 |
| CDM Registration date | 04/11/2008 |
| Crediting period | 04/11/2008 – 03/11/2018 |
| CER issued until | 03/11/2018 |
| UNFCCC Link | <https://cdm.unfccc.int/Projects/DB/SGS-UKL1214472977.27/view> |

A.2. Location of project

The town of Temesi is situated two kilometers east of Gianyar, the capital of the Regency with the same name in the Indonesian province of Bali. The project is located at 115º 20' 59” east of Greenwich and 8º 33' 58” south of the equator. The location of the composting facility is depicted in below figure. The location is right next to the regencies open landfill.

The address of project activity is: Yayasan Pemilahan Sampah Temesi

TPA Temesi

Temesi, Gianyar 80551

Bali, Indonesia

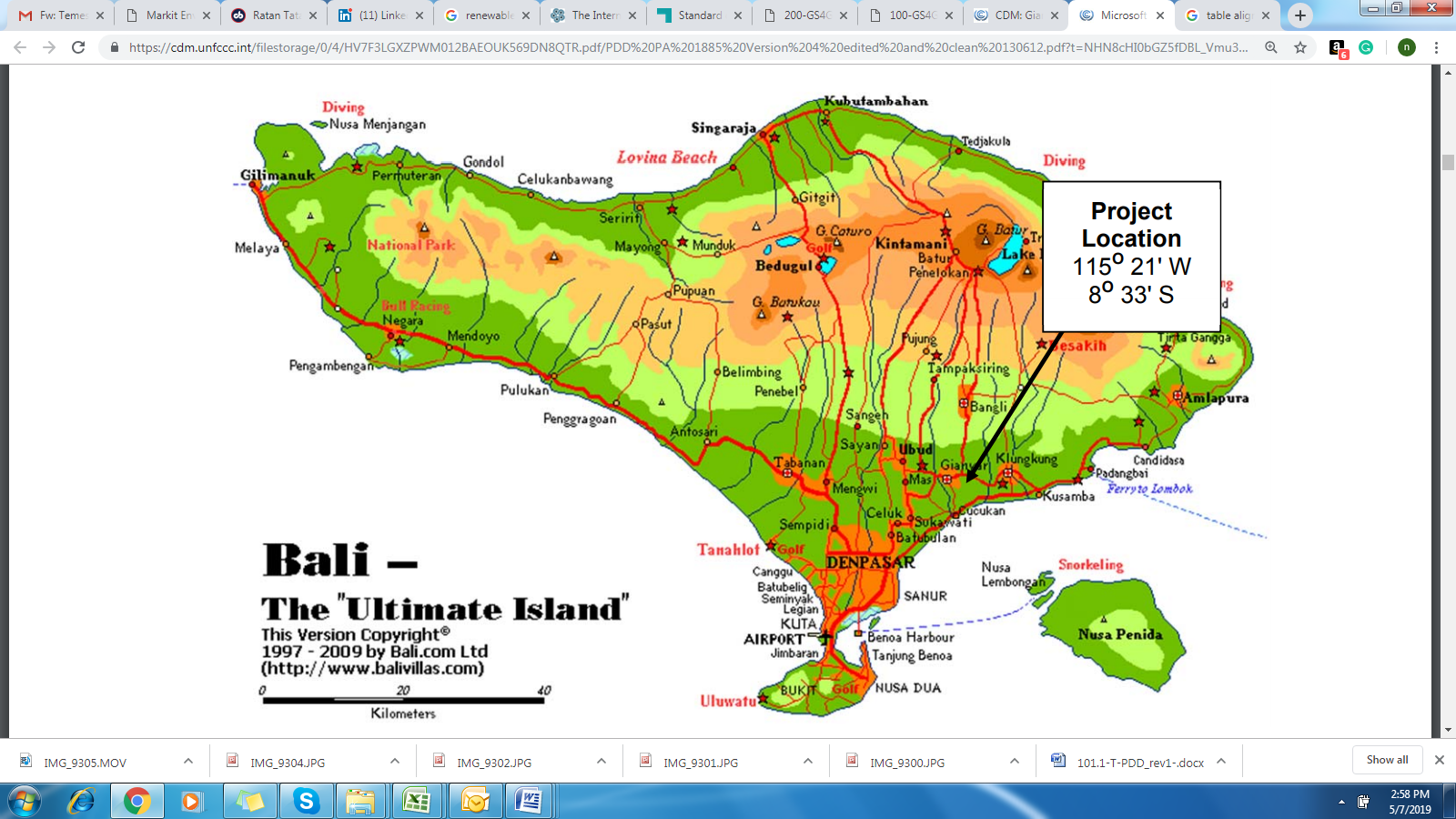


Figure 1: Project location map

A.3. Reference of applied methodology

The project activity applied latest CDM methodology AMS-III.F.: Avoidance of methane emissions through composting, Version 12.0.

A.4. The Crediting Period

The crediting period lasts 5 years from 04/11/2018 to 03/11/2023 including both dates.

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

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 m2 covered processing area with a capacity of maximum 30 tons waste per day. Construction 1st semester 2008 / commissioning May 2008.

2nd Phase: A 2400 m2 extension to 4740 m2 for a final capacity of up to 50 tons waste per day. Construction 2nd semester 2009 / commissioning January 2010.

Implementation status: The project activity was initially implemented as a CDM small scale project activity. It falls now under GS micro scale projects.

In each phase, the processing volume was increased progressively, although monthly variations occurred mostly due to Hindu or Muslim holidays and/or varying availability of waste separating personnel. The CDM registration was received for 04/11/2008.

Our composting technology is very low tech and known since millions of years. Only low tech equipment is used to:

* shred the raw material when indicated,
* turn the composting tables or windrows with front loaders or excavators,
* aerate the processing material with centrifugal blowers to assure aerobic conditions
* sieve to obtain the final compost.

In more detail, incoming waste is manually separated with hand tools. If deemed necessary, coarse material is shredded prior to composting to avoid a slowed down 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 two to three 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 organic 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. Inert residue is discharged.

Compared to the approved project, no deviations have occurred and no delays were incurred.

B.1.1. Forward Action Requests

There are no forward action requests as this is the first Monitoring Report of the Crediting Period.

B.2. Post-Design Certification changes

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

No temporary deviations from certified project information, PDD, monitoring & reporting plan were applied for during this monitoring period.

B.2.2. Corrections

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

B.2.3. 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 are submitted with this monitoring report.

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

No permanent changes from the approved monitoring plan, applied methodologies or applied approaches have been approved by the GS-TAC that are relevant for this monitoring period.

B.2.5. Changes to project design of approved project

No changes of the approved project design have been approved by the GS-TAC for this monitoring period.

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

**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 9 for a list of the Operating Procedures.



Figure 2: Organizational Chart as of 31/12/2021:

**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 figure shows the monitoring points and required equipment calibrations:



Figure 3: Monitoring and calibration

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 are referred to in above figure.

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%. Yearly calibrations is not required.

C.3.3. Other parameters required by the methodology

Other parameters are determined according to the following Operating Procedures:

* 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 (absence of methane capture) is confirmed by written statements of the landfill operator, which are made available to the DOE.

**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 6. The Facility Manager and the Sales Manager are responsible to routinely reviewing quality procedures.

**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 03**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | Φ |
| **Unit** | - |
| **Description** | Model correction factor to account for model uncertainties |
| **Source of data** | Default value as per tool ‘Emissions from solid waste disposal sites’ version 8 |
| **Value(s) applied** | 0.85 |
| **Choice of data or Measurement methods and procedures** | * The parameter is used to calculate the baseline emission * Since the project treats MSW using composting technique, the project falls under Application B of the tool ‘Emissions from solid waste disposal sites’ version 8. * The landfill is located in the humid wet condition.   Hence, the value of 0.85 is appropriate as per the tool. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 04**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **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** | As per tool ‘Emissions from solid waste disposal sites’ version 8 |
| **Value(s) applied** | 0.1 |
| **Choice of data or Measurement methods and procedures** | Default value provided in the tool. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 05**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **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 |
| **Choice of data or Measurement methods and procedures** | IPCC default value as proposed by the tool ‘Emissions from solid waste disposal sites’ version 8 is applied. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 06**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | DOCf |
| **Unit** | Weight fraction |
| **Description** | Default value for the fraction of degradable organic carbon (DOC) in  MSW that decomposes in the SWDS |
| **Source of data** | IPCC 2006 Guidelines for National Greenhouse Gas Inventories |
| **Value(s) applied** | 0.5 |
| **Choice of data or Measurement methods and procedures** | IPCC default value as proposed by the tool ‘Emissions from solid waste disposal sites’ version 8 is applied.  Since this is applied to MSW, the is applicable under Application B. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 07**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | MCF |
| **Unit** | - |
| **Description** | Methane correction factor |
| **Source of data** | IPCC 2006 Guidelines for National Greenhouse Gas Inventories |
| **Value(s) applied** | 0.8 |
| **Choice of data or Measurement methods and procedures** | As per IPCC 2006, 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. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 08**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | DOCj |
| **Unit** | - |
| **Description** | Fraction of degradable organic carbon in the waste type j (weight fraction) |
| **Source of data** | IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5) |
| **Value(s) applied** | |  |  | | --- | --- | | **Waste type j** | **DOCj (% wet waste)** | | Wood and wood products | 43 | | Pulp, paper and cardboard (other than sludge) | 40 | | Food, food waste, beverages and tobacco (other than sludge) | 15 | | Textiles | 24 | | Garden, yard and park waste | 20 | | Glass, plastic, metal, other inert waste | 0 | |
| **Choice of data or Measurement methods and procedures** | Default value suggested by tool ‘Emissions from solid waste disposal sites’ version 8 for the municipal solid waste. 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). |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 09**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | kj |
| **Unit** | 1/yr |
| **Description** | Decay rate for the waste type j |
| **Source of data** | IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3) |
| **Value(s) applied** | |  |  |  | | --- | --- | --- | | Waste type j | | Tropical (MAT>20°C) | | Wet (MAP > 1000 mm) | | Slowly degrading | Pulp, paper, cardboard (other than sludge), textiles | 0.07 | | Wood, wood products and straw | 0.035 | | Moderately degrading | Other (non-food) organic putrescible garden and park waste | 0.17 | | Rapidly degrading | Food, food waste, sewage sludge, beverages and tobacco | 0.40 | |
| **Choice of data or Measurement methods and procedures** | The tool is based on the IPCC 2006 Guidelines and gives the default values for tropical conditions. 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 are used. |
| **Purpose of data** | Calculation of baseline emission. |
| **Additional comment** | Fixed ex-ante |

**Table 10**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | GWPCH4 |
| **Unit** | t CO2e/t CH4 |
| **Description** | Global Warming Potential of methane |
| **Source of data** | IPCC |
| **Value(s) applied** | 28 |
| **Choice of data or Measurement methods and procedures** | Applicable starting 2021 as per IPCC guideline AR5 |
| **Purpose of data** | Calculation of baseline and project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 11**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | GWPN2O |
| **Unit** | t CO2e/t N2O |
| **Description** | Global Warming Potential of nitrous oxide. |
| **Source of data** | IPCC |
| **Value(s) applied** | 265 |
| **Choice of data or Measurement methods and procedures** | Applicable for 2nd commitment period as per IPCC guideline |
| **Purpose of data** | Calculation of baseline and project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 12**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | EFEL,j,y |
| **Unit** | tCO2/MWh |
| **Description** | Emission factor for electricity generation |
| **Source of data** | Directorate General of Electricity, Ministry of Energy and Mineral Resources, Indonesia : 2018 - Emission Factor Reference Official Document  <http://gatrik.esdm.go.id/frontend/download_index/?kode_category=emisi_pl> |
| **Value(s) applied** | 0.88 |
| **Choice of data or Measurement methods and procedures** | Directorate General of Electricity, Ministry of Energy and Mineral Resources, Indonesia published the 2018 - Emission Factor Reference Official Document which is the latest version available now. As per the reference document, the ex-ante emission factor 0.88 tCO2/MWh is applicable for the grid ‘Jamali (Jawa-Madura-Bali)’ in which the project is connected with. |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 13**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | Ddiesel, |
| **Unit** | kg/l |
| **Description** | Density of diesel |
| **Source of data** | IPCC 2006 Guidelines on National GHG Inventories |
| **Value(s) applied** | 0.832 |
| **Choice of data or Measurement methods and procedures** | IPCC default value for diesel |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 14**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | EFCH4 |
| **Unit** | t CH4 / t |
| **Description** | Default emission factor of methane per tonne of waste composted (wet basis) |
| **Source of data** | Tool: Project and leakage emissions from composting, version 2 |
| **Value(s) applied** | 0.002 |
| **Choice of data or Measurement methods and procedures** | This is the default value provided in the tool for the option 2 in the step “Determination of methane and nitrous oxide emissions from the composting process” |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 15**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | EFN2O |
| **Unit** | t N2O / t |
| **Description** | Default emission factor of nitrous oxide per tonne of waste composted (wet basis) |
| **Source of data** | Tool: Project and leakage emissions from composting, version 2 |
| **Value(s) applied** | 0.0002 |
| **Choice of data or Measurement methods and procedures** | This is the default value provided in the tool for the option 2 in the step “Determination of methane and nitrous oxide emissions from the composting process” |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | Fixed ex-ante |

**Table 16**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | TWCOMBAU |
| **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 |
| **Choice of data or Measurement methods and procedures** | 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 (0.85, see Table 3 below). |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | Fixed ex-ante |

D.2. Data and parameters monitored

**Table 17**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | Fy |
| **Unit** | - |
| **Description** | Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y |
| **Source of data** | Based on historic data and written confirmation from landfill site operator |
| **Value(s) applied** | 0 for all vintages |
| **Measurement methods and procedures** | 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. |
| **Monitoring frequency** | Annual |
| **QA/QC procedures** | - |
| **Purpose of data** | Calculation of baseline emission |
| **Additional comment** | - |

**Table 18**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | Wx = Qy = TWCOy |
| **Unit** | T |
| **Description** | Total amount of organic waste composted in year x/y |
| **Source of data** | Source organic waste processed: Annex 1 as summaries. The detailed spreadsheet is submitted with the MR with the name: Details of total organic waste processed 2021 for Annex 1 |
| **Value(s) applied** | Vintage 2021: 6752 |
| **Measurement methods and procedures** | Measure on wet basis using the weighing scales. |
| **Monitoring frequency** | Continuously, aggregated at least annually for year x |
| **QA/QC procedures** | See Operating Procedure 10  The weighing scales will be calibrated once in a year |
| **Purpose of data** | Calculation of baseline emission |
| **Additional comment** | - |

**Table 19**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | pn,j,x |
| **Unit** | - |
| **Description** | Weight fraction of the waste type j in the sample n collected during the year x |
| **Source of data** | The detailed spreadsheets are summarized in Annex 2 of this MR and are submitted with the MR with the name: Details of total organic waste processed 2021 for Annex 2 |
| **Value(s) applied** | The quarterly fractions are listed in Annex 2 |
| **Measurement methods and procedures** | Sample the waste composition, using the waste types j, as provided in the table for DOCj and kj, and weigh each waste fraction (measure on wet basis)  The size and frequency of sampling should provide statistically significant data with a maximum uncertainty range of 20% at a 95% confidence level. Since waste composition is relatively stable over the year, a sampling will be undertaken quarterly (4 times a year). The weighted average of these samplings will be taken as weight fraction of waste type j in year y. |
| **Monitoring frequency** | Quarterly for all vintages |
| **QA/QC procedures** | A detailed sampling procedure has been elaborated, written down and applied to ensure a consistent approach over the crediting period (see Operating Procedure 36). |
| **Purpose of data** | Calculation of baseline emission |
| **Additional comment** |  |

**Table 20**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | Zx |
| **Unit** | - |
| **Description** | Number of samples collected during the year x |
| **Source of data** | Project participants |
| **Value(s) applied** | 12 for all vintages |
| **Measurement methods and procedures** | Minimum of three samples every three months |
| **Monitoring frequency** | Continuously, aggregated annually |
| **QA/QC procedures** | The sample size and sampling technique must ensure the sample is representative (see Operating Procedure 36). |
| **Purpose of data** | Calculation of baseline emission |
| **Additional comment** | - |

**Table 21**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | ECPJ,grid,y |
| **Unit** | MWh |
| **Description** | Quantity of electricity consumed from the grid in year y |
| **Source of data** | Plant records / Confirmation from governmental electric company PLN |
| **Value(s) applied** | 11.697 |
| **Measurement methods and procedures** | Power consumption is directly measured with meters. |
| **Monitoring frequency** | Continuous monitoring and monthly recording |
| **QA/QC procedures** | Operating Procedure 36  Energy meters are calibrated at least once in 5 years. |
| **Purpose of data** | Calculation of project emission |
| **Additional comment** | - |

**Table 22**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | TDLj,y |
| **Unit** | ECpj j y |
| **Description** | Average technical transmission and distribution losses for providing electricity to source j, in year y |
| **Source of data** | Any of the below:  (a) Data provided by grid operator/ government (or)  (b) default value provided in the tool ‘Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 3 (ie, 20%) |
| **Value(s) applied** | 20% for all vintages |
| **Measurement methods and procedures** | -For (a): it should be estimated for the distribution and transmission networks of the electricity grid of the same voltage as the connection where the proposed project activity is connected to. The technical distribution losses should not contain other types of grid losses (e.g. commercial losses/theft). The distribution losses can either be calculated by the project participants or be based on references from utilities, network operators or other official documentation  For (b), default value should be used (ie, 20%) |
| **Monitoring frequency** | Annual |
| **QA/QC procedures** | - |
| **Purpose of data** | Calculation of project emission |
| **Additional comment** | First preference will be given to the data provided by grid operator/government. If the data is not available, then the default value as per the tool, 20% will be used. |

**Table 23**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data / Parameter** | FCdiesel,y |
| **Unit** | L |
| **Description** | Quantity of diesel combusted during the year y |
| **Source of data** | Plant records |
| **Value(s) applied** | 9728.8 |
| **Measurement methods and procedures** | Purchase records and invoices are used to estimate diesel consumption in year y. If possible accuracy will be cross-checked with direct measurements. |
| **Monitoring frequency** | yearly / continuously |
| **QA/QC procedures** | See Operating Procedure 36 |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** |  |

**Table 24**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | NCVdiesel,y |
| **Unit** | TJ/Gg |
| **Description** | Net calorific value of diesel |
| **Source of data** | Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories |
| **Value(s) applied** | 43.3 for all vintages |
| **Measurement methods and procedures** | Since the supplier data is not available, the IPCC default value at the upper limit of the uncertainty at a 95% confidence interval has been considered |
| **Monitoring frequency** | As and when a update in IPCC is available |
| **QA/QC procedures** | - |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** | - |

**Table 25**

|  |  |
| --- | --- |
| **Relevant SDG Indicator** | SDG 13: Climate Action |
| **Data/parameter** | EFdiesel,𝑦 |
| **Unit** | tonnes/TJ |
| **Description** | Emission factor of diesel |
| **Source of data** | Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories |
| **Value(s) applied** | 74.8 for all vintages |
| **Measurement methods and procedures** | Since the supplier data is not available, the IPCC default value at the upper limit of the uncertainty at a 95% confidence interval has been considered. |
| **Monitoring frequency** | As and when a update in IPCC is available |
| **QA/QC procedures** | - |
| **Purpose of data** | Calculation of project emission. |
| **Additional comment** |  |

**Table 26**

|  |  |
| --- | --- |
| **Relevant SDG Indicator/Safeguarding Principle** | SDG 1 |
| **Data / Parameter** | No Poverty |
| **Unit** | Number of Jobs created |
| **Description** | Number of new jobs created due to project implementation. Money spent as salary. |
| **Source of data** | salary vouchers and other financial statements. |
| **Value(s) applied** | 65 |
| **Measurement methods and procedures** | A detailed record of the employees working in the plant is kept separately with all contact details and photographs of the employees. |
| **Monitoring frequency** | Monthly |
| **QA/QC procedures** | - |
| **Purpose of data** | NA |
| **Additional comment** | Details of the salary paid to the employees can be verified with vouchers and bank documents. |

**Table 27**

|  |  |
| --- | --- |
| **Relevant SDG Indicator/Safeguarding Principle** | SDG 3 |
| **Data / Parameter** | Good Health and Well Being |
| **Unit** | NA |
| **Description** | Improvement in the health conditions of the communities in and around the plant. |
| **Source of data** | Survey details |
| **Value(s) applied** | 100% people confirm the improvement in their health condition in the monitoring sample survey |
| **Measurement methods and procedures** | Annually a sample survey will be conducted to see how the health conditions are improved in the region. Also Doctors from nearby hospitals will be consulted to verify the same. |
| **Monitoring frequency** | Annual |
| **QA/QC procedures** | A survey team with the relevant experience will be formed to conduct the survey and the sample size is determined with the latest available guidelines. |
| **Purpose of data** | NA |
| **Additional comment** | NA |

**Table 28**

|  |  |
| --- | --- |
| **Relevant SDG Indicator/Safeguarding Principle** | SDG 6 |
| **Data / Parameter** | Clean Water and Sanitation |
| **Unit** | NA |
| **Description** | Improvement in the clean water availability and sanitation facilities. |
| **Source of data** | Survey results and Lab certificates |
| **Value(s) applied** | 100% people confirm the improvement in the clean water availability and sanitation facilities in the monitoring sample survey |
| **Measurement methods and procedures** | Annually a sample survey will be conducted to see how the status of clean water availability and sanitation facilities are improved in the region.  Water samples will be collected half yearly once and tested in government certified lab and results are compared with the previous readings. |
| **Monitoring frequency** | Sample survey will be conducted annually and water is tested half yearly once. |
| **QA/QC procedures** | Water samples are tested in a reputed and government certified lab |
| **Purpose of data** | NA |
| **Additional comment** | NA |

**Table 29**

|  |  |
| --- | --- |
| **Relevant SDG Indicator/Safeguarding Principle** | SDG 11 |
| **Data / Parameter** | Sustainable Cities and Communities |
| **Unit** | NA |
| **Description** | Cities with good waste management practices |
| **Source of data** | Records of households reached and number of meetings held |
| **Value(s) applied** | 17,500 tonne of waste processed in the plant per annum as a measure is to be increased by documenting how far reaching our communications and our general program development goes |
| **Measurement methods and procedures** | Applying Village profiles and regional population statistics |
| **Monitoring frequency** | Continuously, aggregated at least annually for year x |
| **QA/QC procedures** | NA |
| **Purpose of data** | NA |
| **Additional comment** | NA |

D.3. Comparison of monitored parameters with last monitoring period

|  |  |  |
| --- | --- | --- |
| Data/Parameter | Value obtained in this monitoring period | Value obtained last monitoring period |
| Emission reduction | 7,797 | 16,026 |
|  |  |  |
|  |  |  |

The last monitoring period lasted from 04/11/2018 to 31/12/2020. This period applies only to vintage 2021.

D.4. Implementation of sampling plan

D.4.1. Description of implemented sampling design

The only sampling in the project for SDG 13 involves determining the weight of waste types. According to the "Emissions from solid waste disposal sites" version 8, the weight fraction of the waste types j should be determined by sample measurements. The following waste types will be distinguished:

1. Wood and wood products
2. Pulp, paper and cardboard
3. Food, food waste, beverages and tobacco
4. Textiles
5. Garden, yard and park waste

Since samples are taken from the organic waste proportion only, after separation of recyclable and inert material, category F (glass, plastic, metal and other inert material) is not included in the measurement. Organic waste proportions are relatively stable and therefore estimated only quarterly (defined as minimum sampling frequency per year by the methodology). However, the size and frequency of sampling should be statistically significant with a maximum uncertainty range of 20% at a 95% confidence level.

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 B.7.3.). The size and frequency of sampling required in the sampling plan provides statistically significant data with a maximum uncertainty range of 20 % (= precision or sampling error of +/- 10 %) and a 95 % confidence level. The required confidence level has been reduced to 90 % since the PDD was registered, making the weight sampled more conservative.

D.4.2. Collected data

A summary of the collected sampling data is provided in Annex 2 of the MR. The detailed calculations of the sampling procedure are shown in the separate spreadsheet “Waste composition” available on site to the DOE.

D.4.3. Analysis of the collected data

D.4.3.1. Demonstration that the required confidence/precision has been met

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 actual and historic data in Annex 2).

Based on the sampling results listed in Annex 2, the following calculation determines the precision accomplished with the project’s sampling plan. For this calculation the following standard formula is used:

Precision equals: 1.962 \* sqrt (p \* (1 - p) / n) (sqrt = square root)

Whereas 1.962 represents the z value for a 95% confidence level; n our daily sample size of 100 and p the response distribution. For p the value closest to 50% must be chosen. The p values for waste type E (garden, yard and park waste) are closest to 50%. For the precision calculation a conservative value of 0.7 (for 70%) was chosen, a value closer to 50% than any other ever observed percentage value for any waste type (see also argumentation for 0.7 in D.4.3.2. The value 100 for n reflects the daily sample size of 100 kg. Thus the formula becomes:

Precision equals: 1.962 \* sqrt (0.7 \* (1 - 0.7) / 100) = 0.0899

A precision of 8.99% is achieved at the required confidence level of 95%, a value better than the 10% required by the PPD. Even if the worst-case response distribution of 50% is chosen in a scenario calculation a precision of 9.81% results, a value still below the required 10%.

D.4.3.2. Demonstration on whether a sufficient sample size is applied

The determination of the sample size follows the definition of the sampling plan given in the PDD B.7.2., which determines the applicable sample size for each of the three quarterly sampling days. The Operating Procedure OP 36 and OP 36-1. describes the process in detail.

In the following paragraphs the process of determining the sample size is described. Because the waste type percentages 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 CDM PDD, Annex 4. This decision has been taken after a sensitivity analysis was performed. The sensitivity analysis is included in “Sampling plan for waste types 141231” that is available on site to the DOE.

To achieve the maximum precision of 10% at a 95% confidence level as required by the PDD, in each quarter on each of the three sampling dates, a 100 kg sample is drawn from two different trucks to determine the percentage of the different waste types (Pn,j,y). Please note that the 95% confidence level is obsolete for small scale projects for which now only 90% is required, resulting in even smaller required sample sizes. However, the project continues to take 100 kg samples.

The following equation 3 of Guideline for Sampling and surveys for CDM project activities and programs of activities Version 04.0. is used to arrive at the minimum sample size in kg:

z2 \* p \* q \* N \_\_

(z2 \* p \* q) + ((N - 1) \* y2)

z = value for a confidence level. This z value is 1.962 for a 95% confidence level.

y = value for precision (= 1/2 of uncertainty range of 20%). This value is always 0.1 for a 10% precision.

p = response distribution (expected sample percentage). The value closest to 50% must be chosen to be conservative. In all years of operation, the lowest level has never been below 70% or over 30% for any waste type. Therefor a value of 0.7 (for 70%) is chosen for the sample size calculation.

q = 1 – p. This value is 0.3 (30%).

N = population (PDD value = 32,000). The value stays for 32,000 kg weight processed daily. In reality N is higher, but above 32,000, the sample size hardly changes. The following equation represents the actual values:

1.962 \* 1.962 \* 0.7 \* 0.3 \* 32000\_\_\_\_\_\_\_\_\_\_\_\_

(1.962\* 1.962 \* 0.7 \* 0.3) + ((32000 - 1) \* 0.1 \* 0.1)

The calculation results in a sample size of 80.5 kg each sampling day to satisfy the requirement for a 10% precision at a 95% confidence level. In reality, the project collects a 100 kg sample every sampling day, a weight considerably above the required amount.

D.4.3.3. Demonstration that the samples were randomly selected and are representative of the population

Under the surveillance of the Facility Manager, every quarter at randomly selected three days, a 100 kg sample of organic waste per day is analyzed. The representative 100 kg samples are collected by picking a typical 50 kg fraction from two different trucks. The weight of each fraction is determined and recorded quarterly in the administration PC as OP 36-1 Quarterly Determination of Waste Composition and the percentages are calculated. This sampling process is regulated in the Operating Procedures OP 36 and OP 36-1.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

**E.1.1. SDG 13: Climate Action**

The baseline emissions (BE) are calculated based on the First Order Decay (FOD) Model. The calculation uses the CDM methodology AMS-III.F.: Avoidance of methane emissions through composting, Version 12.0. The actual calculations are submitted with the MR as “Details of 2021 baseline emission for Annex 3”. This BE spreadsheet must be used to calculate each vintage individually by changing the input of the actual parameters like waste types and deposition trend. The emission reductions eligible for vintage are then consolidated in the spreadsheet “Consolidation of total baseline emission 2008 to 2023 of 2021 for Annex 4”. A summary of it is shown in Annex 4.

E.1.1.1. Amount of organic waste processed (Wj)

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 spreadsheets for Annex 3 are based on processing yearly 14,875 tons of organic waste (Cell E4). The yearly deviations from this amount are adjusted in the spreadsheet by inserting into row 31 (Deposition trend) the amount of actual tons processed in percent of the 14,875 tons. 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 consolidation of years.

Table 30: Actual amount organic waste processed and Deposition Trend

Formula: Trend = processed per year / 14875 (to be processed according to PDD)

The total organic waste processed is summarized in Annex 1. The detailed spreadsheet is submitted with this MR named:

Details of total organic waste processed 2021 for Annex 1.

Use: For calculation of baseline emission in Annex 3.

E.1.1.2. Result of sampling waste types (pj,y)

The methodology distinguishes between six types of waste of which five are eligible for emission reductions. The sixth type (inert material like glass and plastic is separated before the determination of waste types and consequently is equal to 0. Table 31 below shows the sampled amounts of organic waste type for each year in percent of total organic waste as measured according to OP 36 CDM Monitoring Process, which complies with the PDD B.7.2.

The percentages of the different waste types are filled into column E, rows 21 to 25 of the BE spreadsheet. Column E row 26 for the sixth type is always 0.

Table 31: Percentage of organic waste types

The detailed spreadsheet is summarized in Annex 2 of this MR and is also submitted to the DOE with this MR named:

Details of total organic waste processed 2021 for Annex 2.

Use: For calculation of baseline emission in Annex 3.

E.1.1.3. Other parameters

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

E.1.1.4. Gross baseline emission

The total baseline emission for this monitoring period is calculated by inserting the data from Table 30 and 31 into the baseline emission spreadsheet for each vintage. An excerpt of this baseline emission spreadsheet is reported in Annex 3. The values obtained in row 47 of the BE spreadsheets are then entered in Annex 4. The same calculation was done for the relevant values of all past vintages since the beginning of the first CDM crediting period as shown in Annex 4.

Table 32: Gross baseline emission for vintage 2021

Source: Annex 4 with the consolidated values from the spreadsheet of Annex 3. The detailed spreadsheet of Annex 3 is submitted with this MR named:

Details of 2021 baseline emissions for Annex 3

Consolidated baseline emissions 2018, to 2023 for Annex 4

**E.2.** **Calculation of project value or estimation of project situation of each SDG Impact**

**E.2.1. SDG 13: Climate Action**

E.2.1.1. Calculation of emissions from electricity consumption (PE power)

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

The electricity consumption for the vintage years of this monitoring period are calculated by adding up the vouchers bought from PLN (National Electric Company).

Table 33: Total electricity consumption

Source: Spreadsheet with value of vouchers purchased. The detailed spreadsheet is summarized in Annex 5 of this MR and submitted with this MR named:

Details of electricity consumption 2021 for Annex 5

Table 34: Calculation of conversion factor kWh to t CO2e

Formula: ECconv factor = FEEL \* (1 + TDLgrid)

Source: Table 12 and 22

Table 35: Total emission from electricity consumption

Formula: PEEC,y = ECy \* ECconv factor / 1000 (kWH > MWh)

Source: Table 33, 34

E.2.1.2. Calculation of emission from on-site diesel consumption (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 compost transports. The facility equipment and truck fuel consumptions are summarized in Annex 5 then entered into Table 36 below.

Table 36: Total diesel consumption

Source: Annex 5 as summary.

The detailed spreadsheet with liters of diesel purchased are summarized in Annex 5 of this MR and submitted with this MR named:

Details of diesel consumption 2021 for Annex 5

Table 37: Calculation of conversion factor liter diesel to tCO2e

Formula: FCconv factor = Ddiesel,y / 1000 (kg > ton) \* NCVdiesel / 1000 (GJ > TJ) \* EFCO2

Source: Table 13, 24, 25

Table 38: Total emission from diesel consumption

Formula: PEdiesel = FCconv factor \* FCdiesel

E.2.1.3. Correction for Methane and Nitrous Oxide emissions from composting

Table 39: Calculation of correction factor for Methane emissions from composting

Formula: CH4 corr factor = EFCH4 \* GWPCH4

Source: Table 10, 14

Table 40: Methane emissions from composting

Formula: PECH4 = Q \* CH4 corr factor

Source: 30, 39

Table 41: Calculation of correction factor for Nitrous Oxide emissions from composting

Formula: N2O corr factor = EFN2O \* GWPN2O

Source: Table 11, 15

Table 42: Nitrous Oxide emissions of from composting

Formula: PEN2O = Q \* N2O corr factor

Table 43: Total project emission

Formula: PEEC + PEFC + PECH4 + PEN2O

Source: Table 35, 38, 40, 42

E.3. Calculation of leakage

**E.3.1. SDG 13: Climate Action**

No leakage needs to be considered, since no composting technology equipment is transferred from or to another activity. Thus the total leakage Ly = 0 tCO2e.

Table 44: Leakage emission

 Source: MR E.3.1. SDG 13: Climate Action

**E.3.1.1. Adjustment factor**

No provision is made in the mandatory Template Guide for the MR v.1.1 for the adjustment of the emission reductions due to prior pilot plant activity before the implementation of the project activity. The emissions reduction after the deduction of the project emission and leakage must be adjusted by a factor (1 - r) for waste volumes processed in the baseline case. The adjustment factor (r) is calculated by dividing the amount of organic waste that has been processed in the pilot plant by the Project capacity (PDD p 36).

Table 45: Calculation of adjustment factor

Formula: 1 - r = WCOMBau / TWCO from PDD p 36

Source: PDD p 36

Note: r is an ex ante value as it is calculated with the PDD Project capacity.

Table 46: Emission reduction from the project activity after adjustment

Formula: ERy = (BEy - PEy - LEy) \* (1 - r)

Source: Tables 32, 42, 44, 45

E.4. Calculation of net benefits or direct calculation for each SDG Impact

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SDG | SDG Impact | Baseline  estimate | Project  estimate | Net  benefit |
| 13 | Emission reduction | 8897 | 775 | 7797 |
| Note to 13: | Net benefit is adjusted with factor 1 – r.  Benefit before 1 – r adjustment (Tables 45 46)  (See Table 45 and 46 for details) |  |  | 8122 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

|  |  |  |
| --- | --- | --- |
| SDG | Values estimated in ex ante calculation of approved PDD  for this monitoring period | Actual values achieved during this monitoring period |
| 13 | 9,198 | 7797 |
| 1 | VIN 04/11/2018 to 31/12/2020: 65 | 61 |
| 3 | VIN 04/11/2018 to 31/12/2020: NA |  |
| 6 | VIN 04/11/2018 to 31/12/2020: NA |  |
| 11 | VIN 04/11/2018 to 31/12/2020: 8,224 | 15,301 |
|  |  |  |
|  |  |  |

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

SDG 13: Our waste separators mostly hail from the island of Java where they went for Ramadan. Their movements were restricted do to Covid and less waste could be processed.

Note: Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

**E.6.1. SDG 13: Climate Action**

NA, the estimated values in the approved PDD were not exceeded.

**E.6.2. SDG 1: No Poverty**

**E.6.3. SDG 3: Good Health and Well Being**

Health hazards reduced in and around the landfill area especially in Temesi village. Indonesia is focusing on improving human health index of the country by innovative approaches and aligned its national policies to improve health of the communities4.

**E.6.4. SDG 6: Clean Water and Sanitation**

The project serves as a landmark and centre of education. Being an advocate for the need of more decentralized material management infrastructure. The project promotes and educates on the need to stop polluting water bodies through illegal dumping and plastic leaking into the environment. A sample survey has been conducted around the facility premises to determine clean water availability and sanitation facilities and improvement of health conditions in and around the Temesi Recycling plant.

**E.6.5. SDG 11: Sustainable Cities and Communities**

The project has been conducting research for over 12 years and provided a platform to grow additional decentralized facilities and infrastructure within the region of Gianyar, Bali. The project has been promoted and facilitating village responsibilities to capture materials on a district and village level and to reduce waste to landfill in order to secure a position as a future sustainable city and national role model. The project serves to promote knowledge and environmental literacy and is tracking the number of households and villages that have been reached.

SECTION F. SAFEGUARDS REPORTING

F.1. List all safeguarding principles and assessments of relevance

* Human Rights
  + The project developer and the project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights.
  + The project shall not discriminate with regards to participation and inclusion.
* Gender Equality and Women´s Rights
  + Is there a possibility that the Project might reduce or put at risk women’s access to or control of resources, entitlements and benefits?
  + Is there a possibility that the Project can adversely affect men and women in marginalized or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?
  + Is there a possibility that the Project might not consider gender roles and the abilities of women or men to participate in the decisions/designs of the project’s activities?
  + Does the Project consider gender roles and the abilities of women or men to benefit from the Project’s activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?
  + Does the Project design contribute to an increase in women’s workload that adds to their care responsibilities or that prevents them from engaging in other activities?
  + Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?
  + Would the Project potentially limit women’s ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?
* Community Health, Safety and Working Conditions
  + The project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community
* Cultural Heritage, Indigenous Peoples, Displacement and Resettlement
  + Does the project area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations or practices)?
  + Does the project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?
  + Does the Project require any change to land tenure arrangements and/or other rights?
  + Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?
  + The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.
* Economic Impacts
  + The Project Developer shall ensure that there is no forced labor and that all employment is in compliance with national labor and occupational health and safety laws, with obligations under international law, and consistency with the principles and standards embodied in the International Labor Organization (ILO) fundamental conventions.
  + Workers shall be able to establish and join labor organizations.
  + Working agreements with all individual workers shall be documented and implemented.
  + The Project Developer shall justify that the employment model applied is locally and culturally appropriate.
  + Child labor, as defined by the ILO Minimum Age Convention is not allowed. The Project Developer shall use adequate and verifiable mechanisms for age verification in recruitment procedures. Exceptions are children for work on their families’ property as long as:
  + *Their compulsory schooling (minimum of 6 schooling years) is not hindered, AND*
  + *The tasks they perform do not harm their physical and mental development, AND*
  + *The opinions and recommendations of an Expert Stakeholder shall be sought and demonstrated as being included in the Project design.*
  + The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures.
* Negative Economic Consequences
  + The project developer shall demonstrate the financial sustainability of the projects implemented, also including those that will occur beyond the project certification period.
  + The Projects shall consider economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been considered in Project design, implementation, operation and after the Project. Particular focus shall be given to vulnerable and marginalized social groups in targeted communities and that benefits are socially-inclusive and sustainable.
* Emissions and Climate, Energy
  + Will the project increase greenhouse gas emissions over the baseline scenario?
  + Will the project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?
* Water
  + Will the Project affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?
  + Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If ‘Yes’ or ‘Potentially’ proceed to question 2.
  + Is the Project’s area of influence susceptible to excessive erosion and/or water body instability?
* Environment, ecology and land use
  + Does the Project involve the use of land and soil for production of crops or other products?
  + Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?
  + Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?
  + Does the project activity release any pollutants?
  + Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?
  + Will the Project involve the application of pesticides and/or fertilizers?
  + Will the Project involve the harvesting of forests?
  + Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?
  + Will the Project involve animal husbandry?
  + Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?
  + Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?
  + Does the Project potentially impact other areas where endangered species may be present through transboundary affects?

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

|  |  |
| --- | --- |
| Name | Nyoman Suarjaya |
| What is your impression of the meeting? | The meeting is very informative and the final discussion and question and answer helped me understand what is being planned for the next 5 years. |
| What do you like about the project? | That they have an educational park and that schools visit on a regular basis. |
| What do you not like about the project? | There still is smell and smoke some weeks. This needs to improve. |

|  |  |
| --- | --- |
| Name | Jero Parch |
| What is your impression of the meeting? | I think that Temesi Recycling helps the community and I appreciate that we get to have meetings like this. |
| What do you like about the project? | The park and clean building premise. It used to all be a big wild dump. |
| What do you not like about the project? | There still are many trucks coming through the village and they need an alternative route. |

|  |  |
| --- | --- |
| Name | Gusti Micik |
| What is your impression of the meeting? | The meeting was long and there was a lot of presentations. I think that everyone understands what is going to happen in the next years. |
| What do you like about the project? | Temesi Recycling has improved the conditions and increased the community´s incomes. |
| What do you not like about the project? |  |

|  |  |
| --- | --- |
| Name | Pande Wayan Merta |
| What is your impression of the meeting? | I appreciated the long technical explanation of composting. The team that is presenting is very young and passionate. I appreciate their efforts |
| What do you like about the project? | It has been a positive contribution to the community and provided many jobs. |
| What do you not like about the project? | There still is smoke on the landfill and the government needs to take responsibility. |

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

**>> None**

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

**>>None**

**Revision History**

|  |  |  |
| --- | --- | --- |
| **Version** | **Date** | **Remarks** |
| 1.1 | 14 October 2020 | Hyperlinked section summary to enable quick access to key sections  Improved clarity on Key Project Information  Section for POA monitoring  Forward action request section  Improved Clarity on SDG contribution/SDG Impact term used throughout  Clarity on safeguard reporting  Clarity on design changes  Leakage section added for VER/CER projects  Addition of Comparison of monitored parameters with last monitoring period  Provision of an [accompanying Guide](https://globalgoals.goldstandard.org/standards/TGuide-PerfCert_V1.1-Monitoring-Report.pdf) to help the user understand detailed rules and requirements |
| 1.0 | 10 July 2017 | Initial adoption |

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

|  |  |
| --- | --- |
| **Organization name** | Yayasan Pemilahan Sampah Temesi |
| **Registration number with relevant authority** |  |
| **Street/P.O. Box** | Jl. Raya Temesi Selatan |
| **Building** | TPA |
| **City** | Temesi, Gianyar |
| **State/Region** | Bali |
| **Postcode** | 80551 |
| **Country** | Indonesia |
| **Telephone** | +62 82144586510 |
| **Fax** | None |
| **E-mail** | [temesi.compost@gmail.com](mailto:temesi.compost@gmail.com) |
| **Website** | www.temesirecycling.com |
| **Contact person** | Sean Nino |
| **Title** | M.A. |
| **Salutation** | Mr. |
| **Last name** | Lotze |
| **Middle name** | Nino |
| **First name** | Sean |
| **Department** | CDM |
| **Mobile** | +62 82144197137 |
| **Direct fax** | None |
| **Direct tel.** | 0361 9082630 |
| **Personal e-mail** | nino@eco-mantra.com |

|  |  |
| --- | --- |
| **Organization name** | myclimate Foundation |
| **Registration number with relevant authority** |  |
| **Street/P.O. Box** | Pfingstweidstrasse 10 |
| **Building** |  |
| **City** | Zürich |
| **State/Region** | Zürich |
| **Postcode** | 8005 |
| **Country** | Switzerland |
| **Telephone** | +41 44 500 4350 |
| **Fax** |  |
| **E-mail** | [info@myclimate.org](mailto:info@myclimate.org) |
| **Website** | [www.myclimate.org](http://www.myclimate.org) |
| **Contact person** | Franziska Heidenreich |
| **Title** | Co-Head of Department |
| **Salutation** | Mrs |
| **Last name** | Heidenreich |
| **Middle name** | Caroline |
| **First name** | Franziska |
| **Department** | Climate Protection Projects |
| **Mobile** |  |
| **Direct fax** |  |
| **Direct tel.** | +41 44 500 4368 |
| **Personal e-mail** | [Franziska.heidenreich@myclimate.org](mailto:Franziska.heidenreich@myclimate.org) |

**Annexes to Monitoring Report**

1 Organic waste processed 2021, version 1 (the detailed spreadsheet is sent with the MR to the DOE)

2 Waste composition 2021, Version 2 (the detailed spreadsheet is sent with the MR to the DOE)

3. Excerpt of baseline emission spreadsheet 2021 (The detailed spreadsheet is sent with the MR to the DOE), version 2

4. Consolidation of total baseline emission 2008 to 2023 version 2 (the detailed spreadsheet is sent with the MR to the DOE)

5. Electricity and diesel consumption 2021, version 1 (the detailed spreadsheet is sent with the MR to the DOE)

6 Linked BE, PE and ER calculation tables 30 to 46 2021 introduction, version 2

7. Calibration of weighing scales and kW-meter 2021, version 1 (all calibration certificates are made available at site to the DOE)

8. Index of Operating Procedures of the Quality System, version 1

9. Summary of SDG impacts and positive contributions

Above annexes are integral parts of the Monitoring Report.

The Supporting Documents below contain details that are sent with the MR or made available at site to the DOE.

**Supporting documents sent with the MR to the DOE**

Linked BE PE and ER calculation tables 30 to 46 2021, version 1

Details of total organic waste processed 2021 for Annex 1, version 1

Waste composition 2021 with summary for Annex 2, version 1

Details of 2021 baseline emissions for Annex 3, version 2

Consolidation of total baseline emission 2008 to 2023 of 2021 for Annex 4, version 2

Details of electricity consumption 2021 for Annex 5, version 1

Details of diesel consumption 2021 for Annex 5, version 1

Sampling plan for waste types, 141231

Sensitivity analysis for waste type percentages, 130127

**Supporting documents available for the DOE on site (not exhaustive)**

GWPCH4 = 21:

Details of 2008 baseline emission for Annex 3 & 4

Details of 2009 baseline emission for Annex 3 & 4

Details of 2010 baseline emission for Annex 3 & 4

Details of 2011 baseline emission for Annex 3 & 4

Details of 2012 baseline emission for Annex 3 & 4

GWPCH4 = 25:

Details of 2008 baseline emission for Annex 3 & 4

Details of 2009 baseline emission for Annex 3 & 4

Details of 2010 baseline emission for Annex 3 & 4

Details of 2011 baseline emission for Annex 3 & 4

Details of 2012 baseline emission for Annex 3 & 4

Details of 2013 baseline emission for Annex 3 & 4

Details of 2014 baseline emission for Annex 3 & 4

Details of 2015 baseline emission for Annex 3 & 4

Details of 2016 baseline emission for Annex 3 & 4

Details of 2017 baseline emission for Annex 3 & 4

Details of 2018 baseline emission for Annex 3 & 4

Details of 2019 baseline emission for Annex 3 & 4

Details of 2020 baseline emission for Annex 3 & 4

GWPCH4 = 28:

Details of 2021 baseline emission for Annex 3 & 4

Others:

Various calibration documents for weighing scales and kW meter 2021

Confirmation no CH4 collected or flared in 2021

Quality System with Operating Procedures

**Annex 1: Organic waste processed 2021, Version 1**

Copied from: Details of total organic waste 2021 with summary for Annex 1, Version 1

(sent with the MR to the DOE)

In kilograms. Total in kg and tons



**Annex 2: Waste composition 2021, Version 2**

Copied from: Waste composition with summary for 2021, Version 1 (sent with the MR to the DOE)



**Annex 3: Excerpt of baseline emission spreadsheet 2021, Version 2**

Copied from: Details of baseline emissions 2021 for Annex 4, version 2 (sent with the MR to the DOE)



For details about generating the above spreadsheet, please refer and to the notes of Annex 4.

**Annex 4:** **Consolidation of Baseline emissions 2008 to 2023 of 2021, Version 2**

Copied from: Consolidation of Baseline emissions 2021 for Annex 4, version 2 (sent with the MR to the DOE)



The BE spreadsheet of Annex 3 creates the input for above table. Annex 3 is based on processing yearly 14,875 tons of organic waste into compost. Any yearly deviation from this amount must be adjusted in the spreadsheet of Annex 3 by inserting a “Deposition Trend” into row 30. The Deposition Trend is the percentage resulting from dividing the actual tons processed in a respective year by 14,875 tons.

The BE spreadsheet of Annex 3 cannot handle different yearly Deposit Trends or Waste Type percentages. Therefore the Deposition Trend and Waste Types of each year must be entered for each year into a separate BE spreadsheet for Annex 3. Because each year requires an individual BE spreadsheet, the Deposit Trend values for other years in Annex 3 remains 0. As a consequence a “#Div/0!” appears in the spreadsheets in cells from row 47 on downwards.

The yearly calculated CO2e values in row 46 of Annex 3 from actual year onwards are copied into above spreadsheet.

**Annex 5: Electricity and diesel consumption 2011, Version 1**

Copied from: Details of electricity consumption 2021 and Details of diesel consumption 2021 (sent with the MR to the DOE)



**Annex 6: Linked BE, PE and ER tables 30 to 46 for MR 2021, Version 2**

A detailed spreadsheet is sent with the MR to the DOE named:

Linked BE, PE and ER tables 30 to 46 for MR 2021, Version 2

Copies of the individual tables with comments are displayed in Chapter:

**E.1.1. SDG 13: Climate Action** of this Monitoring Report.

**Annex 7: Calibration of weighing scales and kWhmeter 2021, Version 1**

Copied from: Various calibration documents are available to the DOE on site.



Note:

* The 2021 calibration of the analogue balances was requested by email to take place before November 11, 2021. However due to technical issues, the governmental Meterologi UPTD was unable to perform the calibrations on or before November 11. The letter of the Meterologi UPTD of December 6, 2021 explaining the technical problem with the November 11 2021 calibration is available to the DOE upon request.

**Annex 8: Index of Operating Procedures of the Quality System, version 1**

**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

OP 40 Compiling the CDM Monitoring Report (Draft)

OP 41 Modalities of Communication (MoC) with CDM Authorities

**Annex 9:Summary of SDG impacts and positive contributions**

•SDG 13: Climate Action:

The project reduces GHG emissions (CH4) by composting municipal solid waste, which otherwise would have been left for anaerobic decay in a solid waste disposal site without methane capture and flaring or power production

•SDG 1 : No Poverty

During construction of the projects many temporary jobs were given, mostly to the local people. Through the operation of this project, about 65 new jobs have been created and especially women are given jobs to run the plant. Hence, the project will help in alleviating the poverty in this region.

•SDG 3: Good Health and Well Being

Solid waste disposed in landfills without treating is generally hazardous as it contains toxic materials and a variety of pathogenic microorganisms . These pathogens can create health problems to the communities who come under the influence of the landfills. Project provides showcase and education for organic waste management and plastics, papers, metals, glass management. Pathogenic microorganisms are eliminated by composting temperature exceeding 70 centigrade, thereby reducing the health hazards related to landfills. Hence, health hazards reduced in and around the landfill area especially in Temesi village due to the project. The project’s Quality System has operating procedures that assure worker’s safety (Procedure no. 24) and health (no. 25). It also provides a system for reporting inadequate conditions (no. 27) and for quality alerts (no. 28 that includes health and safety).

•SDG 6: Clean Water and Sanitation

The adjacent government landfill collects effluent and cleans it in a dedicated waste water treatment plant. No recyclable residue from the Temesi project is deposited on the landfill and potential toxics are treated along with the landfill effluent. In project scenario, organic wastes are composted and treated to remove toxic elements on the waste. Composting temperatures over 70 centigrade eliminate pathogens in the composting effluent thus making it harmless. By converting solid waste into compost and treating waste water to remove toxic elements will reduce the risk of the nearby water bodies getting polluted.

•SDG 11: Sustainable Cities and Communities

In the pre-project scenario, treating waste produced from Gianyar Regency, Bali was a hectic task for the municipality. The landfills are not equipped properly to treat the organic wastes in the solid wastes. Solid wastes are dumped in the landfills without methane capturing and flaring nearby the village of Temesi. In the project scenario, the wastes are treated and converted in to compost which ease the task of waste management of the municipality. Furthermore, the project is a strong advocate for scaling and building decentralized and community owned material management facilities and effectively being a spokesperson on how to reduce waste to landfill and help measure and monitor future progress.