



**Monitoring report form**  
**(Version 04.0)**

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

**MONITORING REPORT**

<b>Title of the project activity</b>	Durban Landfill-gas-to-electricity project – Mariannhill and La Mercy Landfills
<b>Reference number of the project activity</b>	0545
<b>Version number of the monitoring report</b>	1
<b>Completion date of the monitoring report</b>	22/10/2014
<b>Registration date of the project activity</b>	15/12/2006
<b>Monitoring period number and duration of this monitoring period</b>	6 <sup>th</sup> Monitoring Period 15/12/2013 – 30/09/2014 (both days included)
<b>Project participant(s)</b>	<p>South Africa: Durban Solid Waste (DSW) - eThekweni municipality;</p> <p>Netherlands: Netherlands' Ministry of Infrastructure and the Environment (IenM); Electrabel S.A.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&amp;I); International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)</p> <p>Finland: Government of Finland - Ministry of Foreign Affairs of Finland; Fortum Corporation; International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)</p> <p>Germany: RWE Power AG</p> <p>Japan: Chubu Electric Power Co., Inc; The Chugoku Electric Power Co., Inc.; Kyushu Electric Power Co., Inc.; Mitsubishi Corporation; Tohoku Electric Power Co., Inc.; The Tokyo Electric Power Co., Inc.; Shikoku Electric Power Co., Inc.; Japan International Cooperation Agency (JICA); Mitsui &amp; Co. Ltd.</p> <p>Norway: Government of Norway - Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA</p> <p>United Kingdom of Great Britain and Northern Ireland: Deutsche Bank AG; BP Alternative Energy International Ltd</p> <p>France: GDF SUEZ</p> <p>Sweden: Government of Sweden - Swedish Energy Agency;</p> <p>Bilateral and Multilateral Funds: Prototype Carbon fund – Managing Company: International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)</p>
<b>Host Party(ies)</b>	South Africa
<b>Sectoral scope and selected</b>	Sectoral Scope: 13 (Waste Handling and Disposal)

<b>methodology(ies), and where applicable, applied standardized baseline(s)</b>	Methodology: ACM0001: "Large-scale Consolidated Methodology: Flaring or use of landfill gas", (Version 15.0)  Standardized Baseline: ASB0001 "Standardized baseline: Grid Emission Factor for the Southern African power pool", (Version 01.0)
<b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>	49,018 tCO <sub>2</sub> e* <i>*The PDD value been calculated by prorating the PDD yearly values by the number of days to match this monitored period (15/12/2013 to 30/09/2014).</i>
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>	23,459 tCO <sub>2</sub> e
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>	0
<b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b>	23,459 tCO <sub>2</sub> e

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

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The project, when originally registered, consisted of an enhanced collection of landfill gas at two landfill sites of the municipality of Durban, the use of the recovered gas to produce electricity and flaring of the excess gas. The electricity produced is fed into the South African grid system. In its first crediting period, the project was implemented on the Mariannhill and La Mercy landfill sites.

The Mariannhill landfill is an active landfill site where waste will be deposited until 2020. It extends over 49 ha and receives 550 to 850 tonnes of waste per day. To date, the site has received approximately 2,000,000 tonnes. The Mariannhill landfill was officially designated a Nature Conservancy site in late 2002. It is the only landfill in South Africa granted such a status. The second landfill site, La Mercy, was an old landfill, already closed and far away from residential areas. It was receiving around 350 tonnes of waste per day and it closed with about 1 million tonnes of waste in place.

During the first crediting period, the project implemented a landfill gas recovery system at La Mercy and substantially upgraded the collection system at Mariannhill where 6 wells were installed as a pilot activity prior to the implementation of the project activity. A low height enclosed flare with maximum capacity of 1,000 Nm<sup>3</sup>/h and a 1MW electricity generation unit were installed at Mariannhill. Depending on gas availability, electricity generation may be subsequently augmented to up to 2MW of combined capacity.

Meanwhile at the La Mercy site, due to the operational difficulties in extracting the landfill gas, the project activity did not continue extracting gas and was decommissioned on June 2009. A Notification of Changes (NoC) to the PDD was submitted and approved by CDM EB on its 65<sup>th</sup> meeting on 25/11/2011. Therefore, the project for the second and third crediting periods will focus on the gas extraction at the Mariannhill landfill.

The scenario existing prior to the implementation of the project activity was that neither landfill had an active landfill gas collection and utilization system in place. Landfill gas was vented to ensure that the concentration of methane in any particular area of the landfill stayed below hazardous levels. In the past, 6 collection wells were installed on the Mariannhill landfill as a pilot to investigate the feasibility of landfill gas recovery for electricity generation. The baseline scenario is the continuation of the practice prior to the implementation of the project, with limited collection and flaring of methane from the landfills in compliance with applicable regulations and the municipal electric company buying electricity from other suppliers. Therefore, the baseline scenario for the second crediting period is the same as the scenario existing prior to the implementation of the project activity.

The project activity contributes to sustainable development by improving the local environment with positive effects on air and groundwater quality. By displacing electricity from the grid, the project reduces emissions related to coal-fired power production which include sulphur oxides, nitrogen oxides, and particulates. It also reduces the adverse impacts related to transportation of coal and coal mining (dust and acid mine drainage). Near the landfill sites, the project improves the air quality by further reducing the amount of landfill gas released into the atmosphere and thus reducing the risk of exposure of neighbouring residents to odour. With regard to local employment, the project results in a small increase in the area of skilled jobs for operation and maintenance of the equipment.

Construction of the landfill gas management system began on 01/02/2006. The gas combustion equipment was commissioned in November 2006 and the first monitoring period commenced on 15/12/2006. Since then the project has been continuously operating achieving successful verifications for the complete first crediting period. The renewal of the crediting period was approved by the CMD EB on 29/04/2014 and this is the first verification for the second crediting period.

The total GHG emission reductions achieved in this monitoring period are 23,459 tCO<sub>2</sub>e.

## **A.2. Location of project activity**

Mariannhill Landfill is located in the Municipality of eThekweni (formerly known as Durban) in KwaZulu Natal Province, South Africa. The site is located around 20 km to the west of Durban, in the Metro area formerly called the Inner West City Council (IWCC).

Durban is geographically located in the southeast region of South Africa on the Indian Ocean coast. Mariannhill landfill site is located at Latitude: -29.846389, Longitude: 30.837778. The following figure provides details of the physical/geographical location of the project activity:

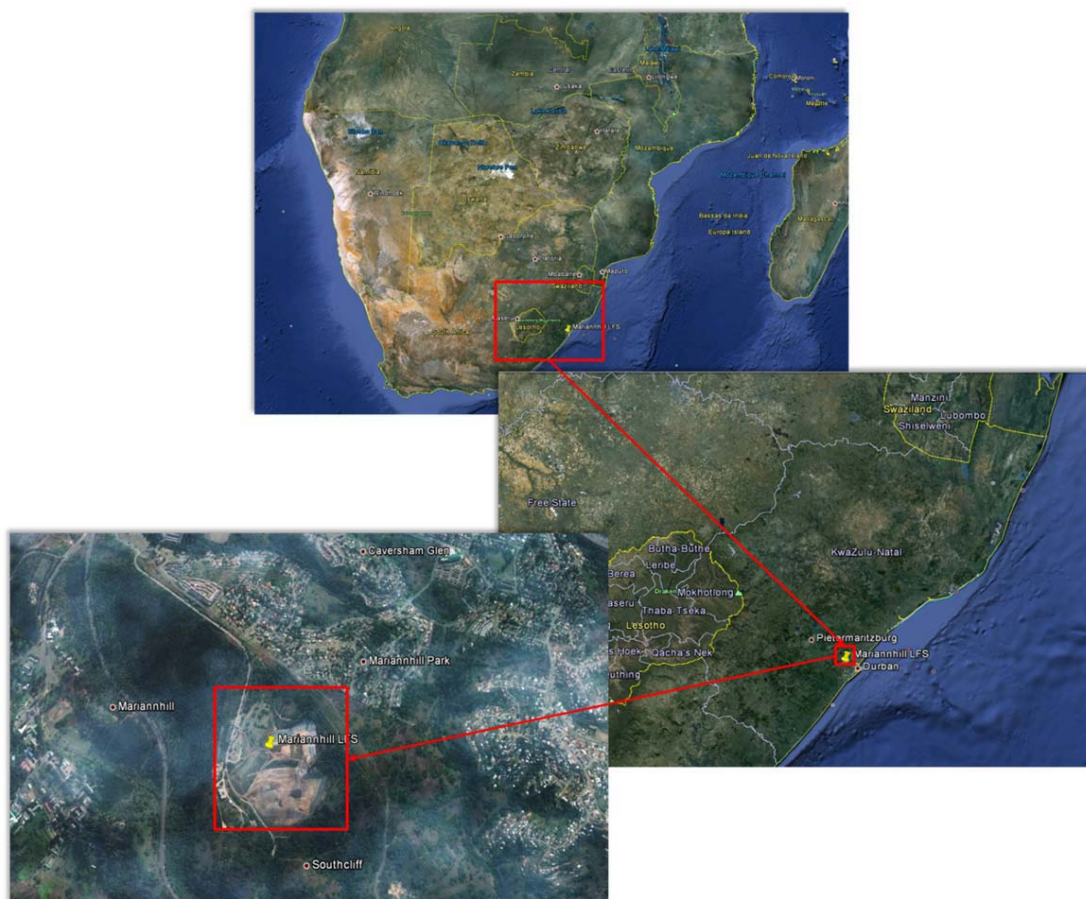


Figure 1 - Physical/geographical location of the project activity

### A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
South Africa (host)	Durban Solid Waste (DSW) – eThekweni Municipality	No
Netherlands	Netherlands' Ministry of Infrastructure and the Environment (IenM); Electrabel S.A.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I);	Yes
Finland	Government of Finland - Ministry of Foreign Affairs of Finland; Fortum Corporation; International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF)	Yes
Germany	RWE Power AG	Yes

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Japan	Chubu Electric Power Co. Inc; The Chugoku Electric Power Co. Inc.; Kyushu Electric Power Co. Inc.; Mitsubishi Corporation; Tohoku Electric Power Co. Inc.; The Tokyo Electric Power Co. Inc.; Shikoku Electric Power Co. Inc.; Japan International Cooperation Agency (JICA); Mitsui & Co. Ltd.	Yes
Norway	Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA	Yes
United Kingdom of Great Britain and Northern Ireland	Deutsche Bank AG; BP Alternative Energy International Ltd	Yes
France	GDF SUEZ	Yes
Sweden	Government of Sweden - Swedish Energy Agency	Yes

#### A.4. Reference of applied methodology and standardized baseline

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The methodology, standardized baseline and tools applied to this project are:

- ACM0001: "Large-scale Consolidated Methodology: Flaring or use of landfill gas" (Version 15.0);
- ASB0001 "Standardized baseline: Grid emission factor for the Southern African power pool" (Version 01.0);
- "Emissions from solid waste disposal sites" (version 06.0.1);
- "Project emissions from flaring" (version 02.0.0);
- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 1);
- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0); and
- "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (Version 03.0.1).

The methodology and methodological tools listed above are available online at the UNFCCC website, at the following link:

<http://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO>

#### A.5. Crediting period of project activity

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The second crediting period of the project activity, to which this monitored period applies, started on 15/12/2013, running for 7 years to 14/12/2020 when it can be renewed.

#### A.6. Contact information of responsible persons/ entities

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This CDM-MR-FORM has been completed by:

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E: [gpearson@slrconsulting.com](mailto:gpearson@slrconsulting.com)

This person is not a project participant listed in Appendix 1 below.

## **SECTION B. Implementation of project activity**

### **B.1. Description of implemented registered project activity**

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Durban Solid Waste (DSW) is the municipal agency responsible for management and operation of multiple landfills in the Durban metropolitan area. Under the project, DSW has commissioned the installation of landfill gas extraction wells, flare units and landfill gas generator for the Mariannhill landfill site. DSW functions as the technical advisor and operator of the project.

Specifically, the following technology has been installed:

- Extraction wells: Over time some 33 gas wells will be constructed during phased restoration of the site to extract the landfill gas as it is produced;
- Gas collection pipework: Pipes collect and transport the gas from the wells to the extraction plant from where the gas is used for electricity generation, with any surplus gas being flared;
- Gas extraction plant (blower): A centrifugal blower is required to extract landfill gas from the wells and supply this to either the generation engine or the flare unit. The blower creates lower pressure inside the wells than in the landfill, thereby sucking the gas from the landfill into the wells and from there to the extraction plant;
- Flare unit: A landfill gas flare with maximum capacity of 1,000Nm<sup>3</sup>/hr has been installed at the site;
- Landfill gas generator: A single 1MW unit has been installed at Mariannhill, which can be turned down to as low as 50% capacity (Jenbacher type 320 engine); and
- Switch gears, transformers and cabling: have been installed as needed for interconnection with the eThekweni Electricity grid.

The system is also equipped with condensate knockout pots in order to keep pipework clear of liquids which form due to changes in temperature. All engine and flaring equipment is housed in a purpose built compound to ensure no unauthorised access and maintain high standards of health and safety. The engine is installed within acoustic housing to minimise noise nuisance. All equipment is manufactured to established European standards and instrument maintenance and calibration procedures are implemented in accordance with the recommendations of the respective manufacturer.

Switch gear, transformers and cabling have been supplied to provide interconnection to the electricity grid system. In addition, the site is equipped with the necessary monitoring and data capture instrumentation to ensure that the requirements of the PDD are addressed.

A regular program of operation and maintenance of gas extraction and combustion equipment has been implemented, based on suppliers' recommendations. Specialist contractors are employed to

carry out environmental monitoring, in addition to maintenance and servicing of the landfill gas flare and engine.

### Status of Implementation

The project has involved the installation of a network of gas collection wells and pipework to which suction pressure is applied in order to draw landfill gas from the waste to undergo controlled combustion in order to generate electricity.

Construction of the landfill gas management system began on 01/02/2006. The gas combustion equipment was commissioned in November 2006 and the first monitoring period commenced on 15/12/2006.

The project implemented a substantial upgrade of a previously existing, small collection system at Mariannhill which comprised six gas collection wells installed as a pilot activity.

The gas utilisation system at Mariannhill currently comprises a single 1MW Jenbacher 320 engine and flare. The network of gas collection wells has been expanded on a phased basis as the site continues to develop, as summarised in the following table.

During this monitoring period 4 new wells – HW14 – HW17 were added.

MARIANNHILL LANDFILL : GAS WELLS AS AT 30 SEPTEMBER 2014																		
Base line wells - Cell 1	Vertical wells installed under Contract WS 5607 (1ND in Cell 1; 6No. in Cell 3)	Gas Riser Pipe (GRP) wells connected under Contract WS 5607 (Cell 4)	Vertical wells installed by Envitech (Cell 4)	Horizontal wells & riser connections installed under Contract WS 5920 and O&M contract (Cell 4 & 5) installed after 2009 and before 1 October 2012					Horizontal wells & riser connections installed between 2-10-2012 and 14-12-2013 (Monitoring Period 5)					Horizontal wells & riser connections installed between 15-12-2013 and 30-09-2014				
				Header Station No.	Valve No. in Header Station	Well No.	Level	Approx. Length	Header Station No.	Valve No. in Header Station	Well No.	Level	Approx. Length	Header Station No.	Valve No. in Header Station	Well No.	Level	Approx. Length
BASLINE GW 1	GW 1	GRP 1	GW 8	HS 1	V8	HW 6	LC	130	HS 1	V15	HW 10	LC	140	HS 1	V7	HW 14	LD	120
BASLINE GW 2	GW 2	GRP 2	GW 9	HS 1	V9	HW 4	LB	120	HSC 3	V1	HW 11	LD	120	HS 1	V6	HW 15	LD	120
BASLINE GW 3	GW 3	GRP 3	GW 10	HS 1	V10	HW 1	LA	140	HSC 3	V2	HW 12	LD	120	HS 1	V13	HW 16	LE	120
BASLINE GW 4	GW 4	GRP 4	GW 11	HS 1	V16	HW 7	LC	102	HSC 3	V3	HW 13	LD	120	HS 1	V14	HW 17	LE	120
BASLINE GW 5	GW 5	GRP 5		HS 1	V17	RISERS (LB)	varies											
BASLINE GW 6	GW 6	GRP 6		HS 1	V18	HW 2	LA	150										
	GW 7	GRP 7		HS 1	V19	HW 3	LA	145										
		GRP 8		HS 1	V20	HW 5	LB	125										
		GRP 9		HS 1	V16	HW 7	LC	130										
				HSC 3	V2	HW 8	LC	140										
				HSC 3	V3	HW 9	LC	140										
NOTE: HW 8 & HW 9 were damaged and abandoned.																		
HW 12 & HW 13 have been linked into the piping previously serving HW 8 & HW 9																		
HW 12 & HW 13 have been abandoned but linked into HW 14.																		

The volume of gas from the baseline wells (GW1 – GW6) has been decreasing with time until it was negligible and below the accurate measurement range of the flow meter used. In addition, from March 2012 well heads and seals were failing due to settlement and allowing oxygen ingress. Trials elsewhere with re-constructing the seals did not produce any significant improvement in gas production or quality. No more gas could be extracted from the baseline wells, therefore it was monitored to the point that no gas could be extracted from them, this being November 2012.

Further wells will be added at Mariannhill when new areas of landfilling are completed.

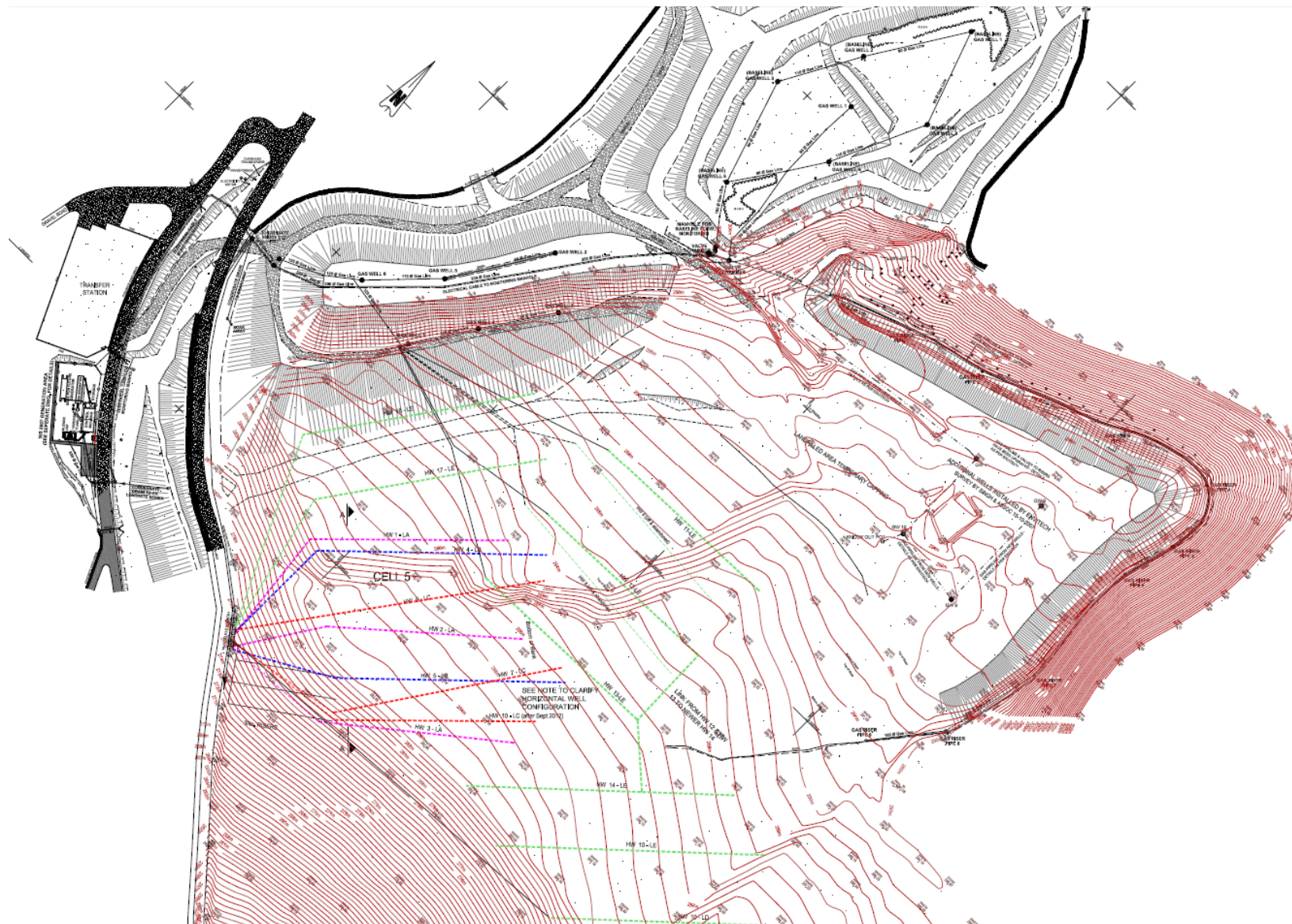
### Operation of the Activity

No major operational difficulties were experienced during the monitoring period.

Minor issues were experienced related to gas extraction as a result of wells not performing or being damaged on site during landfilling operations, power failures and low gas flows / temperature at the flare.

These events are recorded in the monthly SCADA workbooks.







**B.2. Post registration changes****B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

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No temporary deviations have been applied during this monitoring period.

**B.2.2. Corrections**

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

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

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

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

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

**B.2.5. Changes to start date of crediting period**

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

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

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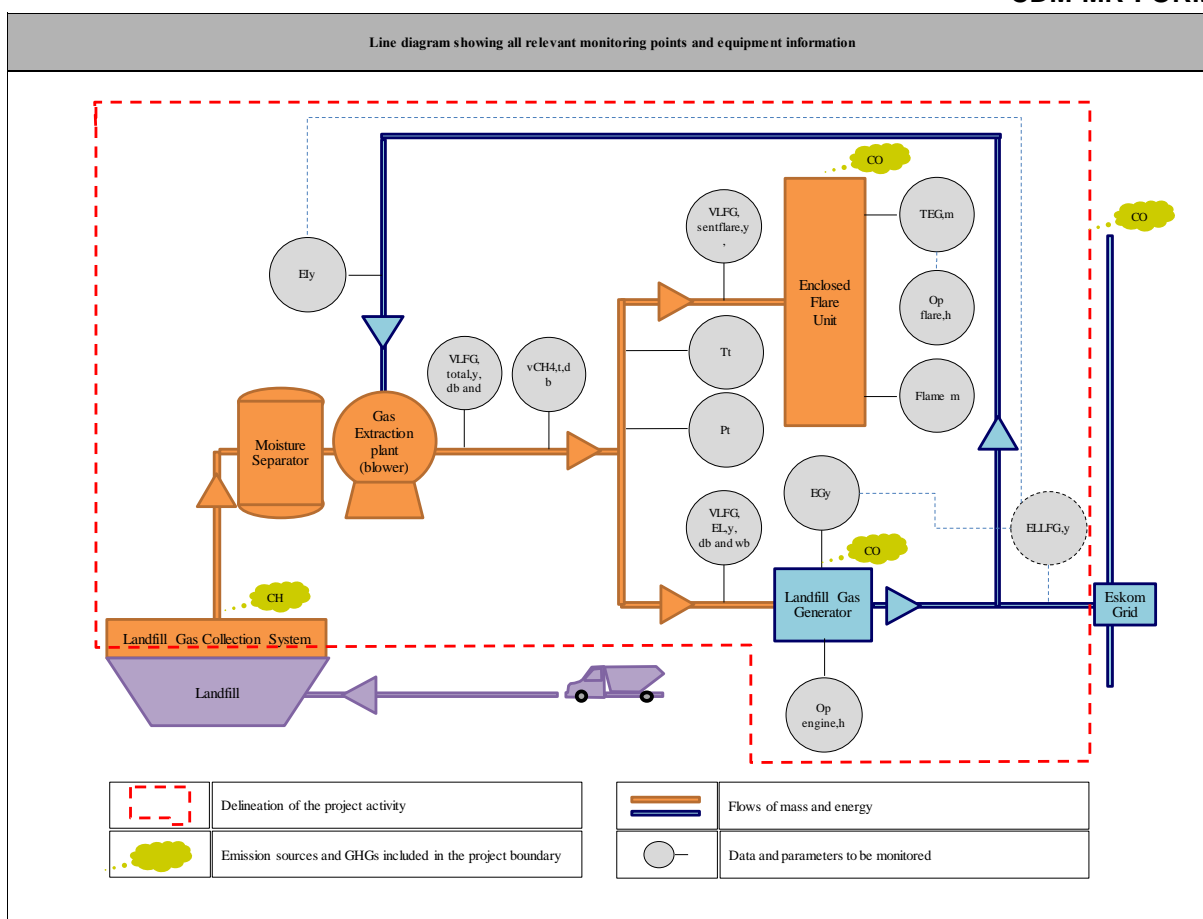
Not applicable.

**SECTION C. Description of monitoring system**

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The flow diagram below presents the equipment, systems and flows of mass and energy for the project. In particular, it includes the data and parameters to be monitored taking into account the project boundary as per methodology ACM0001 "Flaring or use of landfill gas" (version 15.0), as follows:

Line diagram showing all relevant monitoring points and equipment information



The following describes the operational and management structure that the project operator implements in order to monitor emission reductions achieved by the project activity.

#### Data Collection:

The data is mainly collected automatically through a data logger. The data gathered automatically includes gas flow ( $V_{LFG, total, y}$ ,  $V_{LFG, sent\_flare, y}$  and  $V_{LFG, EL, y}$ ), volumetric fraction of methane ( $V_{CH_4, t}$ ), temperature in the exhaust gas of the flare ( $T_{EG, m}$ ), operation of the flare station ( $Op_{flare, h}$ ), operation of the electrical plant ( $Op_{engine, h}$ ), net electricity generated ( $EL_{LFG, y}$ ).

A regular visual inspection is carried out by a designated / trained landfill employee. During this inspection, the employee will check the instrumentation and monitoring data such as gas quality, gas flow, vacuum, and flare temperature. The employee will also analyze the data and adjust the applied vacuum within the landfill to maintain a steady gas quality and flow. Gas quality and vacuum levels will also be periodically checked directly at each gas well, using a portable meter. This routine monitoring allows the identification of underperforming gas wells and the application of necessary corrective actions. The combination of these two inspections optimises the landfill gas collection efficiency.

#### Data Storage:

Raw data from the monitoring instrumentation are automatically logged at minute intervals and stored on the computer system hard drive.

Data are recorded on a secure database on the Proficy Historian Software that is being used to log the data. The data on the secured database cannot be altered or changed.

The data are then extracted monthly onto Microsoft Excel for use in compiling the CER calculations.

Raw data from the monitoring instrumentation are automatically logged at minute intervals and stored on the computer system hard drive. The data are stored on a secured database within the monitoring instrumentation software with a file containing data for each month. On a monthly basis the data are exported from these files to an Excel electronic workbook. The workbook includes capacity for the operator to record any occurrences which are relevant to the calculation of emission reductions and how such occurrences have been addressed. The calculation of emission reductions is checked by use of a bespoke manual 'Methodology for the Calculation of CERs for the Durban/World Bank CDM Landfill Gas to Electricity Project'.

On a monthly basis the electronic data from the Data Acquisition (DA) facility, including the monthly calculated ERs, are downloaded to a portable memory device (memory stick and/or an external hard drive) and transferred to the CDM Contractor's (Envitech Solutions) file server where it is archived under the Project. The CDM Contractor's file server is backed up to an external hard drive on a weekly basis. The monthly calculated ERs are then forwarded electronically to the CDM Project Manager for review and kept in the CDM Project Manager's office as an additional backup copy.

Envitech has provided a CDM Data Processing: Step by Step Methodology manual, for DSW staff to closely follow.

Data are then stored and archived, being kept for at least two years after the end of the crediting period

#### **Project Management Responsibility:**

The project implementation and operation is under the direct supervision of the CDM Project Manager. The following table summarizes the key tasks of the project manager with regard to the monitoring system for the project:

<b>Task</b>	
<b>Monitoring system</b>	<ul style="list-style-type: none"> <li>• Develop and establish management and operations system</li> <li>• Establish and maintain monitoring and reporting system and implement MP</li> </ul>
<b>Data Collection</b>	<ul style="list-style-type: none"> <li>• Establish and maintain data measurement, collection and record keeping systems for landfill gas collection and power supply</li> <li>• Check data quality, collection and record keeping procedures regularly</li> </ul>
<b>Data Computation</b>	<ul style="list-style-type: none"> <li>• Complete MP workbook</li> <li>• Or develop and use equivalent recording, calculation and reporting tool for ERs</li> </ul>
<b>Data Storage systems</b>	<ul style="list-style-type: none"> <li>• Implement record maintenance system</li> <li>• Store and maintain records (paper trail)</li> <li>• Implement sign-off system for records and completed worksheets</li> </ul>
<b>Performance monitoring and reporting</b>	<ul style="list-style-type: none"> <li>• Analyze data and compare project performance with project targets</li> <li>• Analyze system problems and implement improvements (performance management)</li> <li>• Prepare and forward annual report and worksheets to WB CFU</li> </ul>
<b>Quality assurance and verification</b>	<ul style="list-style-type: none"> <li>• Establish and maintain quality assurance system with a view to ensuring transparency and allowing for audits and verification</li> <li>• Prepare for, facilitate and co-ordinate audits and verification process</li> </ul>

The key participants in the organisational structure for the project are:

**CDM Project Manager – Durban Solid Waste (DSW)**

**CDM Manager** – Jon Pass (Wilson & Pass Engineers)  
**CDM Monitoring Contractor** – Envitech Solutions  
**CDM Engine Maintenance Contractor** – Peters Plant Services  
**CDM Flare Maintenance Contractor** – Envitech Solutions / Organics  
**Quality Assurance** – SLR Consulting Limited

### Training of Monitoring Personnel:

The monitoring personnel are trained internally or externally as per requirements identified. Training has included:

- Landfill gas collection system balancing;
- Calibration of monitoring equipment; and
- Impact of the monitoring on the CDM activity.

### Procedure in Case of Failure:

If there is an equipment (flow meter, gas analyser, gauge, etc.) failure, the corresponding entity/person (Landfill Manager, equipment supplier etc) is immediately notified. When possible, repairs are carried out on site.

If the damaged equipment cannot be repaired, it is replaced by the same or an equivalent unit as soon as possible. In some cases, fully calibrated portable instruments are used in order to carry out daily monitoring of the missing parameter(s). These data are recorded on paper and manually included in the CER calculations.

If the engine and flare are not operational, landfill gas will not be combusted and therefore no credits are claimed during such periods.

## SECTION D. Data and parameters

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

<b>Data / Parameter:</b>	<b>OX<sub>top layer</sub></b>
Unit:	Dimensionless
Description:	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline
Source of data:	Methodology ACM0001 "Flaring or use of landfill gas", version 15.0
Value(s) applied:	0.1
Purpose of data:	Calculation of baseline emissions
Additional comment:	Applicable to Step A (Section 5.4.1 ACM0001, version 15.0)

<b>Data / Parameter:</b>	<b>GWP<sub>CH4</sub></b>
Unit:	tCO <sub>2</sub> e/tCH <sub>4</sub>
Description:	Global warming potential of CH <sub>4</sub>
Source of data:	IPCC
Value(s) applied:	25
Purpose of data:	Calculation of baseline emissions
Additional comment:	As per Table 2.14 of the Fourth Assessment Report of the IPCC which can be found at: <a href="http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-4">http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-4</a>

<b>Data / Parameter:</b>	<b>D<sub>CH<sub>4</sub></sub></b>
Unit:	tCH <sub>4</sub> /m <sup>3</sup> CH <sub>4</sub>
Description:	Methane density
Source of data:	Tool "Project emissions from flaring", version 2.0
Value(s) applied:	0.0007168
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>φ</b>
Unit:	-
Description:	Model correction factor to account for model uncertainties
Source of data:	As per the tool "Emissions from solid waste disposal sites" – Version 6
Value(s) applied:	0.75
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>F</b>
Unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	0.5
Purpose of data:	Calculation of baseline emissions
Additional comment:	This factor reflects the fact that some degradable organic carbon does not degrade, or degrades very slowly, under anaerobic conditions in the SWDS. A default value of 0.5 is recommended by IPCC.

<b>Data / Parameter:</b>	<b>f</b>
Unit:	-
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data:	As per the tool "Emissions from solid waste disposal sites" – Version 6
Value(s) applied:	0
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>η<sub>PJ</sub></b>
Unit:	-
Description:	The efficiency of the degassing system which will be installed in the project activity, in year y
Source of data:	As per page 17/37 of ACM0001 / Version 15.0 "Flaring or use of landfill gas"
Value(s) applied:	50%
Purpose of data:	Calculation of baseline emissions
Additional comment:	The efficiency of the planned LFG collection, flaring, and utilization system is taken into account for the ex-ante estimation of emission reductions.



<b>Data / Parameter:</b>	<b>OX</b>
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 the tool "Emissions from solid waste disposal sites" – Version 6
Value(s) applied:	0.1
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>MCF</b>
Unit:	-
Description:	Methane Correction Factor
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	1
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>DOC<sub>j</sub></b>														
Unit:	-														
Description:	Fraction of degradable organic carbon (by weight) in the waste type <i>j</i> .														
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)														
Value(s) applied:	<table border="1"> <thead> <tr> <th>Waste type <i>j</i></th><th>DOC<sub>j</sub> (%wet waste)</th></tr> </thead> <tbody> <tr> <td>Wood and wood products</td><td>43</td></tr> <tr> <td>Pulp, paper and cardboard (other than sludge)</td><td>40</td></tr> <tr> <td>Food, food waste, beverages and tobacco (other than sludge)</td><td>15</td></tr> <tr> <td>Textiles</td><td>24</td></tr> <tr> <td>Garden, yard and park waste</td><td>20</td></tr> <tr> <td>Glass, plastic, metal, other inert waste</td><td>0</td></tr> </tbody> </table>	Waste type <i>j</i>	DOC <sub>j</sub> (%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
Waste type <i>j</i>	DOC <sub>j</sub> (%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														
Purpose of data:	Calculation of baseline emissions														
Additional comment:	The values applied are for wet waste.														

<b>Data / Parameter:</b>	<b>DOC<sub>f</sub></b>
Unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value(s) applied:	0.5
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>k<sub>j</sub></b>
Unit:	-
Description:	Decay rate for the waste type <i>j</i> .

Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3)																																					
Value(s) applied:	<table border="1"> <thead> <tr> <th colspan="2" rowspan="2">Waste type <i>j</i></th><th colspan="2">Boreal and Temperate (MAT≤20°C)</th><th colspan="2">Tropical (MAT&gt;20°C)</th></tr> <tr> <th>Dry (MAP/PET &lt;1)</th><th>Wet (MAP/PET &gt;1)</th><th>Dry (MAP&lt; 1000mm)</th><th>Wet (MAP&gt; 1000mm)</th></tr> </thead> <tbody> <tr> <td rowspan="2">Slowly degrading</td><td>Pulp, paper, cardboard (other than sludge), textiles</td><td>0.04</td><td>0.06</td><td>0.045</td><td>0.07</td></tr> <tr> <td>Wood, wood products and straw</td><td>0.02</td><td>0.03</td><td>0.025</td><td>0.035</td></tr> <tr> <td>Moderately degrading</td><td>Other (non-food) organic putrescible garden and park waste</td><td>0.05</td><td>0.10</td><td>0.065</td><td>0.17</td></tr> <tr> <td>Rapidly degrading</td><td>Food, food waste, beverages and tobacco (other than sludge)</td><td>0.06</td><td>0.185</td><td>0.085</td><td>0.40</td></tr> </tbody> </table>					Waste type <i>j</i>		Boreal and Temperate (MAT≤20°C)		Tropical (MAT>20°C)		Dry (MAP/PET <1)	Wet (MAP/PET >1)	Dry (MAP< 1000mm)	Wet (MAP> 1000mm)	Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04	0.06	0.045	0.07	Wood, wood products and straw	0.02	0.03	0.025	0.035	Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	0.10	0.065	0.17	Rapidly degrading	Food, food waste, beverages and tobacco (other than sludge)	0.06	0.185	0.085	0.40
Waste type <i>j</i>		Boreal and Temperate (MAT≤20°C)		Tropical (MAT>20°C)																																		
		Dry (MAP/PET <1)	Wet (MAP/PET >1)	Dry (MAP< 1000mm)	Wet (MAP> 1000mm)																																	
Slowly degrading	Pulp, paper, cardboard (other than sludge), textiles	0.04	0.06	0.045	0.07																																	
	Wood, wood products and straw	0.02	0.03	0.025	0.035																																	
Moderately degrading	Other (non-food) organic putrescible garden and park waste	0.05	0.10	0.065	0.17																																	
Rapidly degrading	Food, food waste, beverages and tobacco (other than sludge)	0.06	0.185	0.085	0.40																																	
Purpose of data:	Calculation of baseline emissions																																					
Additional comment:	<a href="http://www.worldweather.org/035/c00137.htm">http://www.worldweather.org/035/c00137.htm</a>																																					

<b>Data / Parameter:</b>	<b>Carbon Emission Factor (CEF<sub>electricity,y</sub>)</b>
Unit:	tCO <sub>2</sub> /MWh
Description:	CO <sub>2</sub> emissions intensity of the electricity displaced
Source of data:	Standardized baseline “Grid emission factor for the Southern African power pool”, version 01.0.
Value(s) applied:	0.9488
Purpose of data:	Calculation of baseline emissions and Calculation of project emissions
Additional comment:	The value will be kept fixed for the entire crediting period.

<b>Data / Parameter:</b>	<b>η<sub>flare,m</sub></b>
Unit:	%
Description:	Flare Efficiency in the minute m
Source of data:	As per “Project emissions from flaring” (Version 02.0.0)
Value(s) applied:	0.8
Purpose of data:	The default value flare efficiency will be used to calculate the amount of methane destroyed by flaring ex post as per Option A (1) of “Project emissions from flaring” version 02.0.0. For ex ante estimation of FCH <sub>4,PJ,y</sub> , the estimate baseline emission of methane from the SWDS (according to equation 2) in order to estimate the emission reductions of the proposed project activity in the CDM-PDD are conducted following the tool “Emissions from solid waste disposal sites” (Version 06.0.1)
Additional comment:	According to the tool “Project emissions from flaring” version 02.0.0, for enclosed flares that are defined as low height flares, the flare efficiency in the minute m shall be adjusted, as a conservative approach, by subtracting 0.1 from the efficiency as determined in Options A or B. For example, the default value applied should be 80%, rather than 90%.

<b>Data / Parameter:</b>	<b>R<sub>u</sub></b>
Unit:	Pa.m <sup>3</sup> /kmol.k
Description:	Universal ideal gases constant

Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream", Version 02.0.0
Value(s) applied:	8,314
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

Data / Parameter:	MM <sub>i</sub>								
Unit:	Kg/kmol								
Description:	Molecular mass of greenhouse gas <i>i</i>								
Source of data:	“Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, Version 02.0.0								
Value(s) applied:	<table><tr><td>Compound</td><td>Structure</td><td>Molecular mass (kg/kmol)</td></tr><tr><td>Methane</td><td>CH<sub>4</sub></td><td>16.04</td></tr></table>			Compound	Structure	Molecular mass (kg/kmol)	Methane	CH <sub>4</sub>	16.04
Compound	Structure	Molecular mass (kg/kmol)							
Methane	CH <sub>4</sub>	16.04							
Purpose of data:	Calculation of baseline emissions								
Additional comment:	N/A								

<b>Data / Parameter:</b>	<b>P<sub>n</sub></b>
Unit:	Pa
Description:	Total pressure at normal conditions
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream", Version 02.0.0
Value(s) applied:	101,325 Pa
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

<b>Data / Parameter:</b>	<b>T<sub>n</sub></b>
Unit:	K
Description:	Temperature at normal conditions
Source of data:	"Tool to determine the mass flow of a greenhouse gas in a gaseous stream", Version 02.0.0
Value(s) applied:	273.15
Purpose of data:	Calculation of baseline emissions
Additional comment:	N/A

## D.2. Data and parameters monitored

<b>Data / Parameter:</b>	<b>V<sub>LFG,total,y,db</sub></b>
Unit:	m <sup>3</sup> dry gas/h
Description:	Volumetric flow of total landfill gas which is sent to flare and used for electricity generation in year y on a dry basis
Measured/ Calculated / Default:	Measured
Source of data:	Flow Meter

Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: Kurz Instruments (Flare flow) Accuracy Class: +/- 2% of rate Serial Number: FD20272A Calibration Frequency: recommended annual re-certification and/or in-situ calibration Date of Last Calibration: 30/10/2013 Validity: 30/10/2013 to 29/10/2014  Type: Kurz Instruments (Engine flow) Accuracy Class: +/- 2% of rate Serial Number: FD20273A Calibration Frequency: recommended annual re-certification and/or in-situ calibration Date of Last Calibration: 30/10/2013 Validity: 30/10/2013 to 29/10/2014
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Measured readings from each meter are added together to derive the total volume of landfill gas.
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications, but at least every 2 years.
Purpose of data:	Calculation of baseline emissions
Additional comment:	This parameter will be monitored as per Option A of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 2.0.0. No separate monitoring of temperature and pressure is necessary since flow meters that derive LFG volumes in normalized cubic meters will be used.

<b>Data / Parameter:</b>	<b>V<sub>LFG,sent flare,y,db</sub></b>
Unit:	m <sup>3</sup> dry gas/h
Description:	Volumetric flow of landfill gas which is sent to flare in year y on a dry basis
Measured/ Calculated / Default:	Measured
Source of data:	Flow Meter
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls

Monitoring equipment:	Type: Kurz Instruments (Flare flow) Accuracy Class: +/- 2% of rate Serial Number: FD20272A Calibration Frequency: recommended annual re-certification and/or in-situ calibration Date of Last Calibration: 30/10/2013 Validity: 30/10/2013 to 29/10/2014
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications, but at least every 2 years.
Purpose of data:	Calculation of baseline emissions
Additional comment:	This parameter will be monitored as per Option A of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 2.0.0. No separate monitoring of temperature and pressure is necessary since flowmeters that derive LFG volumes in normalized cubic meters will be used.

<b>Data / Parameter:</b>	<b>V<sub>LFG,EL,y,db</sub></b>
Unit:	m <sup>3</sup> dry gas/h
Description:	Volumetric flow of landfill gas which is used for electricity generation in year y on a dry basis
Measured/ Calculated / Default:	Measured
Source of data:	Flow Meter
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: Kurz Instruments (Engine flow) Accuracy Class: +/- 2% of rate Serial Number: FD20273A Calibration Frequency: recommended annual re-certification and/or in-situ calibration Date of Last Calibration: 30/10/2013 Validity: 30/10/2013 to 29/10/2014
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Periodic calibration against a primary device provided by an independent accredited laboratory is mandatory. Calibration and frequency of calibration is according to manufacturer's specifications, but at least every 2 years.
Purpose of data:	Calculation of baseline emissions



Additional comment:	This parameter will be monitored as per Option A of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 2.0.0. No separate monitoring of temperature and pressure is necessary since flowmeters that derive LFG volumes in normalized cubic meters will be used.
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<b>Data / Parameter:</b>	<b>T<sub>t</sub></b>
Unit:	K
Description:	Temperature of the gaseous stream in time interval t
Measured/ Calculated / Default:	Measured
Source of data:	Temperature Transmitter
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: WIKA TR200 Accuracy Class: 0.75% of full scale Serial Number: 46002570 Calibration Frequency: not applicable Date of Last Calibration: not applicable Validity: item to be replaced on failure as required
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Temperature transmitter is subject to a regular maintenance and testing regime to ensure accuracy
Purpose of data:	Calculation of baseline emissions
Additional comment:	As per the last version of the "Tool to determine the mass flow of a GHG in a gaseous stream" (Version 02.0.0), Option 2 (Simplified calculation without measurement of the moisture content) will be used to determine the absolute humidity by assuming the gaseous stream is dry or saturated depending on which is the conservative situation. The applicability condition related to the gaseous stream flow temperature being below 60°C is adopted and therefore, this parameter must be monitored continuously to assure the applicability condition is met.

<b>Data / Parameter:</b>	<b>P<sub>t</sub></b>
Unit:	Pa
Description:	Pressure of the gaseous stream in time interval t
Measured/ Calculated / Default:	Measured
Source of data:	Pressure Transmitter

Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: GE Sensing Druck PTX 7900-3399 Accuracy Class: +/- 0.25% of full scale Serial Number: 2345399 Calibration Frequency: not applicable Date of Last Calibration: not applicable Validity: item to be replaced on failure as required
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Pressure transmitter is subject to a regular maintenance and testing regime to ensure accuracy
Purpose of data:	Calculation of baseline emissions
Additional comment:	As per the last version of the "Tool to determine the mass flow of a GHG in a gaseous stream" (Version 02.0.0), Option 2 (Simplified calculation without measurement of the moisture content) will be used to determine the absolute humidity by assuming the gaseous stream is dry or saturated depending on which is the conservative situation. The applicability condition related to the gaseous stream flow temperature being below 60°C is adopted.

<b>Data / Parameter:</b>	<b><math>V_{CH_4,t,db}</math></b>
Unit:	m <sup>3</sup> CH <sub>4</sub> /m <sup>3</sup> dry gas
Description:	Volumetric fraction of CH <sub>4</sub> in a time interval t on a dry basis
Measured/ Calculated / Default:	Measured
Source of data:	Gas analyser
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls

Monitoring equipment:	<p>Type: Edinburgh Instruments, Gascard NG  Accuracy Class: +/- 2% of range  Serial Number: 2309  Calibration Frequency: calibration check at least annually  Date of Last Calibration: see below  Validity: valid throughout the monitoring period</p> <p><i>In accordance with the recommendations of the manufacturer, the stationary analysers are checked on at least an annual basis using certified calibration gas or a handheld Biogas 5000 gas analyser which is itself fully calibrated (see below).</i></p> <p><i>Within the monitored period, calibration of the stationary Gascard gas analyser using certified calibration gas was carried out each time the GDU is serviced, on 17/12/2013, 28/03/2014 and 09/07/2014.</i></p> <p><i>The handheld Biogas 5000 gas analyser is serviced and calibrated annually by the manufacturer and also checked and adjusted periodically by the monitoring contractor using certified calibration gas. The Biogas 5000 is used in the event of failure of the stationary analysers and is also used to check and calibrate the stationary Gascard gas analysers on site to maintain levels of accuracy.</i></p> <p>Handheld Instrument (Biogas 5000)  Serial Number: G500625  Accuracy: +/-0.5% of methane content  Calibration frequency: annual  Date of last calibration: 30/08/2013, 15/01/2014  Validity of Calibration Certificates: 30/08/2013 – 29/08/2014  15/01/2014 – 14/01/2015</p>
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Calibration should include zero verification with an inert gas (e.g. N <sub>2</sub> ) and at least one reading verification with a standard gas (single calibration gas or mixture calibration gas). All calibration gases must have a certificate provided by the manufacturer and must be under their validity period.
Purpose of data:	Calculation of baseline emissions
Additional comment:	<p>This parameter will be monitored as per Options A and B of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", version 2.0.0.</p> <p>The meter has been installed in this first phase of the project activity in the main line between the flare and the booster.</p>

Data / Parameter:	EG <sub>PJ,y</sub>
Unit:	MWh
Description:	Amount of electricity generated using LFG
Measured/ Calculated / Default:	Measured
Source of data:	Electricity Meter

Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: Landis +Gyr (Export) Accuracy Class: 0.10% Serial Number: 86342181 Calibration Frequency: 10 years Date of Last Calibration: 22/03/2006 Validity: valid through the current monitoring period, up to 21/03/2016
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Electricity meter will be calibrated as per manufacturer's specifications, but at least once every 10 years. Electricity meter will be subject to regular (in accordance with stipulation of the meter supplier) maintenance and testing to ensure accuracy. Data will be recorded electronically, and kept during the crediting period and two years after.
Purpose of data:	Calculation of baseline emissions
Additional comment:	-

<b>Data / Parameter:</b>	<b>EC<sub>PJ,y</sub></b>
Unit:	MWh
Description:	Quantity of electricity consumed by the project activity during the year y
Measured/ Calculated / Default:	Measured
Source of data:	Electricity Meter
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls

Monitoring equipment:	Type: Landis +Gyr (Import) Accuracy Class: 0.10% Serial Number: 85066208 Calibration Frequency: 10 years Date of Last Calibration: 26/08/2005 Validity: valid through the current monitoring period, up to 25/08/2015
Measuring/ Reading/ Recording frequency:	Continuous
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Electricity meter will be calibrated as per manufacturer's specifications, but at least once every 10 years. Electricity meter will be subject to regular (in accordance with stipulation of the meter supplier) maintenance and testing to ensure accuracy. Data will be recorded electronically, and kept during the crediting period and two years after.
Purpose of data:	Calculations of baseline emissions
Additional comment:	This parameter refers to the electricity consumed from the grid by the project activity.

<b>Data / Parameter:</b>	<b>Op<sub>engine,h</sub></b>
Unit:	-
Description:	Operation of the engine that consumes the LFG
Measured/ Calculated / Default:	Measured
Source of data:	Electricity Meter and SCADA system
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Type: Landis +Gyr (Export) Accuracy Class: 0.10% Serial Number: 86342181 Calibration Frequency: 10 years Date of Last Calibration: 22/03/2006 Validity: valid through the current monitoring period, up to 21/03/2016
Measuring/ Reading/ Recording frequency:	Hourly
Calculation method (if applicable):	For the engine using the LFG monitor that the plant is operating in hour h by monitoring the following: • Products generated: Monitor the generation of electricity generated. Op <sub>engine,h</sub> = 0 when: • No products are generated in the hour h Otherwise, Op <sub>engine,h</sub> = 1
QA/QC procedures:	Operation of engine is confirmed by its own control box which sends a signal to the PLC to communicate whether it is running or off.
Purpose of data:	Calculation of baseline emissions



Additional comment:	Data will be kept for at least two years after the end of the crediting period.
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Data / Parameter:	$Op_{flare,h}$
Unit:	-
Description:	Operation of the flare that consumes the LFG
Measured/ Calculated / Default:	Measured
Source of data:	Thermocouple and SCADA system
Value(s) of monitored parameter:	<p>Values are provided in monthly spreadsheets:</p> <p>CDM Data 2013_12.xls  CDM Data 2014_01.xls  CDM Data 2014_02.xls  CDM Data 2014_03.xls  CDM Data 2014_04.xls  CDM Data 2014_05.xls  CDM Data 2014_06.xls  CDM Data 2014_07.xls  CDM Data 2014_08.xls  CDM Data 2014_09.xls</p>
Monitoring equipment:	<p>Thermocouple that monitors flame temperature (see below) and SCADA system.</p> <p>Flame Thermocouple:  Type: Type N Thermocouple Probe  Serial Number: 3397084  Calibration Frequency: Replace as required, at least annually  Date of Last Calibration: 29/11/2013  Validity: 3 years</p> <p><i>Initial calibrations of the thermocouples are performed in the manufacturer's factory before being installed at the project site. Function is routinely checked by the monitoring contractor and items are replaced when malfunctions are noted, usually every few months, and should be replaced at least annually. The site record sheets show that replacements took place on 17/12/2013 during the monitoring period, with the following thermocouples being used:</i></p> <ol style="list-style-type: none"> <li>1. SN 7650 – 15/12/2013 – 17/12/2013</li> <li>2. SN 3397084 – 17/12/2013 to present date</li> </ol>
Measuring/ Reading/ Recording frequency:	Hourly
Calculation method (if applicable):	<p>For the enclosed flare using the LFG monitor that it is operating in hour h by monitoring the following:</p> <ul style="list-style-type: none"> <li>• Temperature. Determine the location for temperature measurements and minimum operational temperature based on manufacturer's specifications of the burning equipment;</li> <li>• Flame. Flame detection system is used to ensure that the equipment is in operation;</li> </ul> <p><math>Op_{flare,h} = 0</math> when:</p> <ul style="list-style-type: none"> <li>• One or more temperature measurements are missing or below the minimum threshold in hour h (instantaneous measurements are made at least every minute);</li> <li>• Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute);</li> </ul> <p>Otherwise, <math>Op_{flare,h} = 1</math></p>
QA/QC procedures:	Thermocouples shall be replaced on failure or at least annually
Purpose of data:	Calculation of baseline emissions

Additional comment:	Data will be kept for at least two years after the end of the crediting period.
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<b>Data / Parameter:</b>	<b>Flame<sub>m</sub></b>
Unit:	Flame on or Flame off
Description:	Flame detection of flare in the minute m
Measured/ Calculated / Default:	Measured
Source of data:	Flame Detector
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls
Monitoring equipment:	Flame Detector
Measuring/ Reading/ Recording frequency:	Once per minute
Calculation method (if applicable):	Detection of flame recorded as a minute that the flame was on, otherwise recorded as a minute that the flame was off.
QA/QC procedures:	Equipment shall be maintained and calibrated in accordance with manufacturer's recommendations
Purpose of data:	Calculation of baseline emissions
Additional comment:	Data will be kept for at least two years after the end of the crediting period.

<b>Data / Parameter:</b>	<b>T<sub>EG,m</sub></b>
Unit:	°C
Description:	Temperature in the exhaust gas of the enclosed flare in minute m
Measured/ Calculated / Default:	Measured
Source of data:	Thermocouple
Value(s) of monitored parameter:	Values are provided in monthly spreadsheets: CDM Data 2013_12.xls CDM Data 2014_01.xls CDM Data 2014_02.xls CDM Data 2014_03.xls CDM Data 2014_04.xls CDM Data 2014_05.xls CDM Data 2014_06.xls CDM Data 2014_07.xls CDM Data 2014_08.xls CDM Data 2014_09.xls

Monitoring equipment:	<p>Equipment Type: Type N Thermocouple Probe  Accuracy Class:  Serial Number: 3397084  Calibration Frequency: Replace as required, at least annually  Date of Last Calibration: 29/11/2013  Validity: 3 years</p> <p><i>Initial calibrations of the thermocouples are performed in the manufacturer's factory before being installed at the project site. Function is routinely checked by the monitoring contractor and items are replaced when malfunctions are noted, usually every few months, and should be replaced at least annually. The site record sheets show that replacements took place on 17/12/2013 during the monitoring period, with the following thermocouples being used:</i></p> <ol style="list-style-type: none"> <li>1. SN 7650 – 15/12/2013 – 17/12/2013</li> <li>2. SN 3397084 – 17/12/2013 to present date</li> </ol>
Measuring/ Reading/ Recording frequency:	Once per minute
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Thermocouples shall be replaced on failure or at least annually
Purpose of data:	Not used in the calculations
Additional comment:	Data will be kept for at least two years after the end of the crediting period.

<b>Data / Parameter:</b>	<b>TDL<sub>y</sub></b>
Unit:	%
Description:	Average technical transmission and distribution losses in the grid in year y for the voltage level at which electricity is obtained from the grid at the project site.
Measured/ Calculated / Default:	Default
Source of data:	Value of average transmission losses from the South African national electricity utility, Eskom Report 2013/2014, page 98, available at <a href="http://integratedreport.eskom.co.za/pdf/full-integrated.pdf">http://integratedreport.eskom.co.za/pdf/full-integrated.pdf</a>
Value(s) of monitored parameter:	8.88%
Monitoring equipment:	Manual check
Measuring/ Reading/ Recording frequency:	Annual check
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Eskom website will be checked annually.
Purpose of data:	Calculation of baseline emissions and Calculation of project emissions
Additional comment:	-

<b>Data / Parameter:</b>	<b>Management of SWDS</b>
Unit:	-
Description:	<b>Management of SWDS</b>
Measured/ Calculated / Default:	Measured
Source of data:	Site records

Value(s) of monitored parameter:	The PE is in compliance with their operational manual and procedures.
Monitoring equipment:	Manual check
Measuring/ Reading/ Recording frequency:	Annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Any change in the management of the landfill will be justified by referring to technical or regulatory specifications. Also, it will be documented and filed by the landfill operator.
Purpose of data:	-
Additional comment:	-

### D.3. Implementation of sampling plan

&gt;&gt;

Not applicable.

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

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

&gt;&gt;

According to the baseline methodology ACM0001 – Version 15.0, baseline emissions are calculated as follows:

$$BE_y = BE_{CH_4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y} \quad \text{Equation (1)}$$

Where:

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>e/yr)

$BE_{CH_4,y}$  = Baseline emissions of methane from the SWDS in year y (t CO<sub>2</sub>e/yr)

$BE_{EC,y}$  = Baseline emissions associated with electricity generation in year y (t CO<sub>2</sub>/yr)

$BE_{HG,y}$  = Baseline emissions associated with heat generation in year y (t CO<sub>2</sub>/yr)

$BE_{NG,y}$  = Baseline emissions associated with natural gas use in year y (t CO<sub>2</sub>/yr)

Heat is not generated and natural gas is not used in the project and therefore both  $BE_{HG,y}$  and  $BE_{NG,y}$  are assigned a value of zero.  $BE_{CH_4,y}$  and  $BE_{EC,y}$  are calculated as follows:

#### Calculation of $BE_{CH_4,y}$

Baseline emissions of methane from the SWDS are calculated as follows:

$$BE_{CH_4} = ((1 - OX_{top\_layer}) \times F_{CH_4,PJ,y} - F_{CH_4,BL,y}) \times GWP_{CH_4} \quad \text{Equation (2)}$$

Where:

$BE_{CH_4,y}$  = Baseline emissions of methane from the SWDS in year y (t CO<sub>2</sub>e/yr)

$OX_{top\_layer}$  = Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)

$F_{CH_4,PJ,y}$  = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,BL,y}$  = Amount of methane in the LFG that would be flared in the baseline in year y (t CH<sub>4</sub>/yr)

$GWP_{CH_4}$  = Global warming potential of CH<sub>4</sub> (t CO<sub>2</sub>e/t CH<sub>4</sub>)

In the calculations of emission reductions,  $OX_{top\_layer}$  is assigned a value of 0.1 and  $GWP_{CH_4}$  is assigned a value of 25. No methane would be flared in the baseline scenario and therefore  $F_{CH_4,BL,y}$  is assigned a value of zero.  $F_{CH_4,PJ,y}$  is calculated as follows:

### Calculation of $F_{CH_4,PJ,y}$

$F_{CH_4,PJ,y}$  is determined as the sum of the quantities of methane flared and used in power plants, boilers, air heaters, glass melting furnaces, kilns and natural gas distribution network as follows:

$$F_{CH_4,PJ,y} = F_{CH_4,flared,y} + F_{CH_4,EL,y} + F_{CH_4,HG,y} + F_{CH_4,NG,y} \quad \text{Equation (3)}$$

Where:

$F_{CH_4,PJ,y}$  = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,flared,y}$  = Amount of methane in the LFG which is destroyed by flaring in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,EL,y}$  = Amount of methane in the LFG which is used for electricity generation in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,HG,y}$  = Amount of methane in the LFG which is used for heat generation in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,NG,y}$  = Amount of methane in the LFG which is sent to the natural gas distribution network and/or to the trucks in year y (t CH<sub>4</sub>/yr)

No methane in the project is either used for heat generation or sent to the natural gas distribution network and therefore both  $F_{CH_4,HG,y}$  and  $F_{CH_4,NG,y}$  are assigned a value of zero.

As an example using data from the month of January 2014, the aggregated value of  $F_{CH_4,PJ,y}$  for the month is 97.70 t CH<sub>4</sub>.

### Calculation of $F_{CH_4,flared,y}$

$F_{CH_4,flared,y}$  is calculated as the difference between the amount of methane supplied to the flare and any methane emissions from the flare as follows:

$$F_{CH_4,flared,y} = F_{CH_4,sent\_flare,y} - \frac{PE_{flare,y}}{GWP_{CH_4}} \quad \text{Equation (4)}$$

Where:

$F_{CH_4,flared,y}$  = Amount of methane in the LFG which is destroyed by flaring in year y (t CH<sub>4</sub>/yr)

$F_{CH_4,sent\_flare,y}$  = Amount of methane in the LFG which is sent to the flare in year y (t CH<sub>4</sub>/yr)

$PE_{flare,y}$  = Project emissions from flaring of the residual gas stream in year y (t CO<sub>2</sub>e/yr)

$GWP_{CH_4}$  = Global warming potential of CH<sub>4</sub> (t CO<sub>2</sub>e/t CH<sub>4</sub>)

For the second crediting period of the project,  $GWP_{CH_4}$  is assigned a value of 25.

$F_{CH_4,sent\_flare,y}$  is determined using the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream". The tool requires the calculation as follows (Option A is used as the gaseous stream has a temperature of less than 60°C):

$$F_{i,t} = V_{t,db} * v_{i,t,db} * \rho_{i,t}$$

With

$$\rho_{i,t} = P_t * MM_i / R_u * T_t$$

Where:



- $F_{i,t}$  = Mass flow of greenhouse gas  $i$  in the gaseous stream in time interval  $t$  (kg gas/h)  
 $V_{t,db}$  = Volumetric flow of the gaseous stream in time interval  $t$  on a dry basis ( $m^3$  dry gas/h)  
 $V_{i,t,db}$  = Volumetric fraction of greenhouse gas  $i$  in the gaseous stream in a time interval  $t$  on a dry basis ( $m^3$  gas  $i/m^3$  dry gas)  
 $\rho_{i,t}$  = Density of greenhouse gas  $i$  in the gaseous stream in time interval  $t$  (kg gas  $i/m^3$  gas  $i$ )  
 $P_t$  = Absolute pressure of the gaseous stream in time interval  $t$  (Pa)  
 $MM_i$  = Molecular mass of greenhouse gas  $i$  (kg/kmol)  
 $R_u$  = Universal ideal gases constant ( $Pa \cdot m^3/kmol \cdot K$ )  
 $T_t$  = Temperature of the gaseous stream in time interval  $t$  (K)

The gas temperature and pressure are monitored to allow these calculations to be carried out.

As an example using data from the month of January 2014, the aggregated value of  $F_{CH_4,flared,y}$  for the month is 11.33 t  $CH_4$ .

### Calculation of $PE_{flare,y}$

$PE_{flare,y}$  is calculated in accordance with “Project emissions from flaring” (version 02.0.0)

$$PE_{flare,y} = GWP_{CH_4} \times \sum_{m=1}^{525600} F_{CH_4,RG,m} \times (1 - \eta_{flare,m}) \times 10^{-3} \quad (15)$$

Where:

- $PE_{flare,y}$  = Project emissions from flaring of the residual gas in year  $y$  (tCO<sub>2</sub>e)  
 $GWP_{CH_4}$  = Global warming potential of methane valid for the commitment period (tCO<sub>2</sub>e/tCH<sub>4</sub>)  
 $F_{CH_4,RG,m}$  = Mass flow of methane in the residual gas in the minute  $m$  (kg)  
 $\eta_{flare,m}$  = Flare efficiency in minute  $m$

A default flare efficiency has been applied for the project. The default value used is 80% to reflect that the flare is an enclosed, low height variant. As described in the PDD, if the flame is detected in minute  $m$  but the temperature of the flare or flow rate of the residual gas are not within the manufacturers specification for the flare, a default value of 50% will be applied. If the flare is not operating, the flare efficiency is 0% and no emissions are claimed.

The global warming potential of methane is given a default value of 25.

$F_{CH_4,RG,m}$  is determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, Option A as described above.

As an example using data from the month of January 2014, the aggregated value of  $PE_{flare,y}$  for the month is 134.32 t CO<sub>2</sub>e.

### Calculation of $F_{CH_4,EL,y}$

$F_{CH_4,EL,y}$  is also determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” and the working hours of the power plant are monitored so that no emission reductions are claimed for methane destruction during non-working hours. The tool requires the calculation as follows (Option A is used as the gaseous stream has a temperature of less than 60°C):

$$F_{i,t} = V_{t,db} \times V_{i,t,db} \times \rho_{i,t}$$

With

$$\rho_{i,t} = P_t \times MM_i / R_u \times T_t$$

Where:

$F_{i,t}$  = Mass flow of greenhouse gas i in the gaseous stream in time interval t (kg gas/h)  
 $V_{t,db}$  = Volumetric flow of the gaseous stream in time interval t on a dry basis (m<sup>3</sup> dry gas/h)  
 $V_{i,t,db}$  = Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis (m<sup>3</sup> gas i/m<sup>3</sup> dry gas)  
 $\rho_{i,t}$  = Density of greenhouse gas i in the gaseous stream in time interval t (kg gas i/m<sup>3</sup> gas i)  
 $P_t$  = Absolute pressure of the gaseous stream in time interval t (Pa)  
 $MM_i$  = Molecular mass of greenhouse gas i (kg/kmol)  
 $R_u$  = Universal ideal gases constant (Pa.m<sup>3</sup>/kmol.K)  
 $T_t$  = Temperature of the gaseous stream in time interval t (K)

The gas temperature and pressure are monitored to allow these calculations to be carried out.

As an example using data from the month of January 2014, the aggregated value of  $F_{CH_4,EL,y}$  for the month is 86.36 t CH<sub>4</sub>.

Using the example figures from January 2014 as referenced above, the calculation of  $BE_{CH_4,y}$  produces a value of 2,198.16 t CO<sub>2</sub>e for the month.

### Calculation of $BE_{EC,y}$

Calculation of  $BE_{EC,y}$  is determined using the “Tool to calculate baseline, project and/or leakage emissions from electricity” (version 1).

$$BE_{EC,y} = \sum_k EC_{BL,k,y} \times EF_{EL,k,y} \times (1 + TDL_{k,y}) \quad (2)$$

Where:

$BE_{EC,y}$  = the baseline emissions from electricity consumption by the project activity during the year (t CO<sub>2</sub>/yr)

$EC_{BL,k,y}$  = the quantity of electricity that would be consumed by the baseline electricity consumption source k during the year y (MWh)

$EF_{EL,k,y}$  = the emission factor for the grid in year y (tCO<sub>2</sub>/MWh)

$TDL_{k,y}$  = the average technical transmission and distribution losses in the grid in the year y for the voltage level at which electricity is obtained from the grid at the project site.

As an example using data from the month of January 2014:

- 456.73 MWh of electricity was produced by the project;
- the emission factor of the grid, as defined by the standardized baseline “Grid emission factor for the Southern African power tool”, is 0.9488 tCO<sub>2</sub>/MWh; and
- the average technical transmission and distribution losses, based on the most recently published data from Eskom<sup>1</sup>, was 8.88%.

On the basis of the above, the baseline emissions from electricity production by the project for the month of January 2014 are therefore:

- $456.73 \times 0.9488 \times (1 + 0.0888) = 471.83 \text{ t CO}_2\text{e}$

For January 2014, the total baseline emissions ( $BE_y$ ) are therefore the sum of  $BE_{EC,y}$  and  $BE_{CH_4,y}$  which equates to 2,669.99 t CO<sub>2</sub>e.

<sup>1</sup> Integrated Results for the year ended 31 March 2014. Eskom. 11<sup>th</sup> July 2014

Electronic spreadsheets are attached as follows which present the full calculations referenced in this monitoring report:

CDM Data 2013\_12.xls  
 CDM Data 2014\_01.xls  
 CDM Data 2014\_02.xls  
 CDM Data 2014\_03.xls  
 CDM Data 2014\_04.xls  
 CDM Data 2014\_05.xls  
 CDM Data 2014\_06.xls  
 CDM Data 2014\_07.xls  
 CDM Data 2014\_08.xls  
 CDM Data 2014\_09.xls

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

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Project emissions are calculated as:

$$PE_y = PE_{EC,y} + PE_{FC,y} + PE_{DT,y}$$

Where:

$PE_y$  = Project emissions in year  $y$  (t CO<sub>2</sub>/yr)

$PE_{EC,y}$  = Emissions from consumption of electricity due to the project activity in year  $y$  (t CO<sub>2</sub>/yr)

$PE_{FC,y}$  = Emissions from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year  $y$  (t CO<sub>2</sub>/yr)

$PE_{DT,y}$  = Emissions from the distribution of compressed/liquefied LFG using trucks, in year  $y$  (t CO<sub>2</sub>/yr)

The project has not consumed fossil fuels or distributed compressed/liquefied LFG using trucks and therefore both  $PE_{FC,y}$  and  $PE_{DT,y}$  are not calculated and are assigned a value of zero.

The value of  $PE_{EC,y}$  is calculated using the “Tool to calculate baseline, project and/or leakage emissions from electricity” (version 1).

Project emissions from consumption of electricity are calculated based on the quantity of electricity consumed, an emission factor for electricity generation and a factor to account for transmission losses, as follows:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y}) \quad (1)$$

Where:

$PE_{EC,y}$  = the project emissions from electricity consumption by the project activity during the year (t CO<sub>2</sub>/yr)

$EC_{PJ,j,y}$  = the quantity of electricity consumed by the project activity during the year  $y$  (MWh)

$EF_{EL,j,y}$  = the emission factor for the grid in year  $y$  (tCO<sub>2</sub>/MWh)

$TDL_{j,y}$  = the average technical transmission and distribution losses in the grid in the year  $y$  for the voltage level at which electricity is obtained from the grid at the project site.

As an example using data from the month of January 2014:

- 20.63 MWh of electricity was consumed by the project;
- the emission factor of the grid, as defined by the standardized baseline “Grid emission factor for the Southern African power tool”, is 0.9488 tCO<sub>2</sub>/MWh; and

- the average technical transmission and distribution losses, based on the most recently published data from Eskom<sup>2</sup>, was 8.88%.

On the basis of the above, the project emissions from electricity consumption by the project for the month of January 2014 are therefore:

- $20.63 \times 0.9488 \times (1 + 0.0888) = 21.31 \text{ t CO}_2$

Electronic spreadsheets are attached as follows which present the full calculations referenced in this monitoring report:

CDM Data 2013\_12.xls  
 CDM Data 2014\_01.xls  
 CDM Data 2014\_02.xls  
 CDM Data 2014\_03.xls  
 CDM Data 2014\_04.xls  
 CDM Data 2014\_05.xls  
 CDM Data 2014\_06.xls  
 CDM Data 2014\_07.xls  
 CDM Data 2014\_08.xls  
 CDM Data 2014\_09.xls

### E.3. Calculation of leakage

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Under methodology ACM0001 "Flaring or use of landfill gas" Version 15.0, no leakage effects need to be accounted for.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e)	Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e)
<b>Total</b>	23,662	202	0	23,459

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

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	49,018 tCO <sub>2</sub> e	23,459 tCO <sub>2</sub> e

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

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<sup>2</sup> Integrated Results for the year ended 31 March 2014. Eskom. 11<sup>th</sup> July 2014

The actual emission reductions achieved during the monitoring period were lower than predicted in the registered PDD. This is mainly due to frequent power outages impacting on the operation of equipment at the site.

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

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	Not applicable	23,459

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

<b>Project participant and/or responsible person/ entity</b>	<input type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM
<b>Organization name</b>	SLR Consulting Limited
<b>Street/P.O. Box</b>	Holsworth Park
<b>Building</b>	2 <sup>nd</sup> Floor, Hermes House
<b>City</b>	Shrewsbury
<b>State/Region</b>	Shropshire
<b>Postcode</b>	SY3 5HJ
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<b>Telephone</b>	+44 (0)1743 239250
<b>Fax</b>	
<b>E-mail</b>	gpearson@slrconsulting.com
<b>Website</b>	
<b>Contact person</b>	
<b>Title</b>	Principal Consultant
<b>Salutation</b>	Mr
<b>Last name</b>	Pearson
<b>Middle name</b>	
<b>First name</b>	Grant
<b>Department</b>	
<b>Mobile</b>	+44 (0)7733 364598
<b>Direct fax</b>	
<b>Direct tel.</b>	
<b>Personal e-mail</b>	

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### Document information

Version	Date	Description
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>• Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>• Editorial improvement.</li> </ul>

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		