



**CLEAN DEVELOPMENT MECHANISM  
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)  
Version 01**

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NOTE:

(i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

(ii) The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)<sup>1,2</sup> that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

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<sup>1</sup> The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

<sup>2</sup> At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

**SECTION A. General description of CDM programme activity (CPA)****A.1. Title of the CPA:**

CPA[CPA number; format CPA00 where 00 is the next available number: 01, 02 etc.]“Landfill gas capture and utilisation project at [landfill name]Landfill”

Version: [number]

Date: [dd/mm/yyyy]

**A.2. Description of the CPA:**

Instructions: below text bodies that are in *italic* are suggested text bodies, the author may divert from the exact text, expand the text or replace by similar text. Text between [squared brackets] must be replaced with appropriate values. All yellow highlighted text should be adjusted to reflect the specific situation the CPA-DD describes.

Red boxes like this one are to be removed when drafting the CPA-DD. They are only intended as guidance.

Landfill gas capture and utilisation project at [landfill name] Landfill in South Africa (hereinafter referred to as “the CPA[CPA number]”) is to be implemented as part of the CDM PoA Landfill Gas Utilisation Programme of South Africa.

*The landfill is located [specify the location of the landfill] and is operational since [provide year]. The landfill currently covers an area of approximately [provide number] hectares. On average, some [provide amount of waste] tonnes of waste are deposited per year at the site. The landfill is operated and owned by [name of the landfill’s owner/operator] and is a [provide description concerning type of landfill and waste disposed]. Currently the landfill gas, which is a product of waste decomposition, is neither collected nor flared.*

The CPA involves reduction of greenhouse gases and adverse environmental effects of the landfill gas through capturing the landfill gas at [landfill name] Landfill. [provide short description of the CPA background and project scenario]

The CPA owner, [name of the CPA owner], has obtained the right to extract and utilize the landfill gas.

Sustainable development benefits have been outlined at PoA level. Apart from those benefits the CPA contributes to the following benefits:

- [provide description of sustainable development benefits that are related to the CPA]

**A.3. Entity/individual responsible for CPA:**



The [landfill name] Landfill is owned and operated by [name of the landfill's owner/operator]. The company [name of the CPA owner] (hereinafter referred to as “[short name of the CPA owner]”) has obtained a [gas rights agreement<sup>3</sup>] for the utilization of the landfill gas produced at [landfill name] from [name of landfill's owner/operator]. [name of the CPA owner] is responsible for the implementation of CPA [CPA number] under the PoA and is the owner of CPA [CPA number].

#### A.4. Technical description of the CPA:

The CPA consists of [provide list of components to be used in the CPA based on the PoA-DD]

The general design of the installation for capturing and utilisation of the landfill gas is presented in the scheme below.

[provide scheme]

##### Figure 1. Scheme of the installation

[provide description of the technology, phases and dependences related to the CPA]

The total annual emission reductions from the landfill gas capture and electricity generation are estimated as [provide the amount of emission reductions] tCO<sub>2</sub>e/year.

#### A.4.1. Identification of the CPA:

The CPA is identified under the “Landfill Gas Utilisation Programme of South Africa” as CPA [CPA number]. [name of the CPA owner] is responsible for implementation of the CPA at [landfill name] landfill.

##### A.4.1.1. Host Party:

The host party of the CPA is the Republic of South Africa.

#### A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

The CPA landfill is located at [provide address and geographical location]. The GPS coordinates are: [provide GPS coordinates].

[provide map with geographical presentation of the CPA]

Figure 2. Detailed geographical presentation of [landfill name] landfill. [Source: [provide source]]

<sup>3</sup> Agreement is made available to the validator



**A.4.2. Duration of the CPA:**

**A.4.2.1. Starting date of the CPA:**

[dd/mm/yyyy] (The starting date of the CPA [CPA number] is set upon [specify at what stage])

**A.4.2.2. Expected operational lifetime of the CPA:**

[CPA expected operational lifetime in years]

**A.4.3. Choice of the crediting period and related information:**

Renewable crediting period

**A.4.3.1. Starting date of the crediting period:**

[dd/mm/yyyy]

**A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:**

7 years

**A.4.4. Estimated amount of emission reductions over the chosen crediting period:**

**Table 1. Estimated amount of emissions.**

Year	Total Annual estimation of emission reductions in tonnes of CO <sub>2</sub> e
[start year]	
[year]	
[year]	
[year]	
[year]	
[year]	
[year]	
[end year]	
<b>Total estimated reduction (tonnes of CO<sub>2</sub>e)</b>	
<b>Total number of crediting years</b>	7
<b>Annual average over the crediting period of estimated reduction (tonnes of CO<sub>2</sub>e)</b>	

**A.4.5. Public funding of the CPA:**



The CPA [CPA number] does not obtain public funding.

**A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:**

It has been confirmed in the Inclusion Agreement between the CME and [name of CPA owner] that the CPA [CPA number] is registered neither as an individual CDM project nor as a CPA of another PoA. CME has double-checked this information in the UNFCCC CDM database and with the South African Designated National Authority (DNA).



**SECTION B. Eligibility of CPA and Estimation of emissions reductions**

**B.1. Title and reference of the Registered PoA to which CPA is added:**

Landfill Gas Utilisation Programme of South Africa

**B.2. Justification of the why the CPA is eligible to be included in the Registered PoA:**

The CPA [CPA number] is eligible for inclusion in the “Landfill Gas Utilisation Programme of South Africa” because it fulfils the following criteria as described in the PoA-DD:

**complete the table below with comments/sources and check if all answers are correct**

**Table 2. Eligibility criteria from the Landfill Gas Utilisation Programme of South Africa PoA**

Eligibility criteria	Yes/ No/	Comment/ Source
1) The CPA is within the Republic of South Africa and hence it’s boundary is consistent with the geographical boundary of the PoA.	Yes	See section A.4.1.2
2) Documentary evidence that the start date of the CPA is not prior to the commencement of validation of the programme of activities.	Yes	
3) In the baseline scenario the landfill gas is(baseline scenario LFG2): released into the air OR partially captured and/or vented to comply with regulations or contractual requirements, or to address safety and odour concerns OR partially captured and/or inefficiently flared to comply with regulations or contractual requirements, or to address safety and odour concerns.	Yes	See section B.3.
4) In the baseline scenario the electricity is: Obtained from an existing/ new fossil based captive power plant (baseline scenario P4) OR Obtained from the grid (baseline scenario P6).	Yes	See section B.3
5) The project scenario comprises of the capturing of landfill gas and the subsequent: flaring in an enclosed flare OR usage for energy generation with a back-up flare.	Yes	See section A.4.
6) The CPA owner assures unique identification of the location by erecting a sign on site stating that the CPA is part of the ‘Landfill Gas Utilisation Programme of South Africa’.	Yes	To be confirmed during validation or first verification
7) The CME has checked and confirmed that the CPA is neither	Yes	-



	registered as an individual CDM project nor included under another registered PoA.		
8)	The CPA complies with applicability criteria of methodology ACM0001 <i>Consolidated baseline and monitoring methodology for landfill gas projects activities</i> (Version 11.0) used in the PoA.	Yes	See section E.2 in PoA-DD
9)	The CPA owner has evidenced ownership of and/or permit for the use of the landfill gas produced at project site.	Yes	
10)	An additionality analysis has been performed at CPA level.	Yes	See section B.3 below
11)	If required by relevant South African legislation, an Environmental Impact Assessment (EIA) has been performed.	Yes	See section C below
12)	A stakeholder consultation has been performed at CPA level.	Yes	See section D below
13)	No diversion of official development assistance has taken place in case the CPA receives funding from an Annex I parties.	Yes	See section A.4.5 above
14)	The CPA owner has contractually ceded any claims to the CERs generated to the CME.	Yes	See Inclusion Agreement
15)	The CPA complies with either scenario A, B or C of the <i>Tool to calculate baseline, project and/or leakage emissions from electricity consumption</i> (Version 01)	Yes	
16)	The CPA uses a) the <i>Tool to calculate the emission factor for an electricity system</i> (Version 02.2.1) when supplying electricity to the national grid OR b) the emission factor of a captive power plant when replacing the electricity of that plant	Yes	

**B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:**

ACM0001 *Consolidated baseline and monitoring methodology for landfill gas projects activities* (Version 11.0) refers to the *Tool for the demonstration and assessment of additionality* (Version 05.2.1) to assess and demonstrate the additionality of the CPA.

The tool comprise the following steps:

- STEP 1. Identification of alternatives to the project activity consistent with current laws and regulations;
- STEP 2. Investment analysis;
- STEP 3. Barrier analysis (optional);
- STEP 4. Common practice analysis.

**Step 1. Identification of alternatives to the project activity consistent with current laws and regulations**

Realistic and credible alternative scenarios (alternatives) to the project activity(s) will be identified through the following Sub-steps:

***Sub-step 1a. Define alternative scenarios to the proposed CDM project activity***



Identification of the alternatives has been made considering the scenarios derived from the methodology ACM0001 (Version 11.0) and described in section E.4 of the PoA-DD. The following scenarios have been identified for the CPA as presented in the table below.

**complete the table below with identified alternative scenarios to the CPA**

**Table 3. Alternative scenarios to the CPA**

Scenario	Baseline Landfill Gas	Electricity	Description of scenario
A			
B			
...			

***Sub-step 1b. Consistency with mandatory applicable laws and regulations***

All scenarios listed above are in compliance with the following South African waste regulations<sup>4</sup> as explained in the PoA-DD:

- Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
- Hazardous Substances Act (Act 5 of 1973)
- Health Act (Act 63 of 1977)
- Environment Conservation Act (Act 73 of 1989)
- Occupational Health and Safety Act (Act 85 of 1993)
- National Water Act (Act 36 of 1998)
- The National Environmental Management Act (Act 107 of 1998)
- Air Quality Act (Act 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act 59 of 2008)

**Step 2. Investment analysis**

*[provide description of investment analysis if chosen]*

**Step 3. Barrier analysis**

*[provide description of barrier analysis if chosen]*

**Table 4. Identified barriers for development of the CPA**

Type of barrier	Identified barrier

*[provide explanation of identified barriers]*

<sup>4</sup> South African Waste Information Centre (2011): Legislation. Available at: <http://www.sawic.org.za/?menu=13> (website accessed on 21.09.2011)





**Step 4. Common practice analysis**

***Sub-step 4a. Analyse other activities similar to the proposed project activity***

As it has been demonstrated in the PoA-DD landfilling is the most viable option for disposal of solid waste.

***Sub-step 4b. Discuss any similar options that are occurring***

As explained in Sub-step 4a above, the common practice in terms of landfill gas is either to only dump waste without any further management of the landfill gas, vent landfill gas to lower its concentration below hazardous levels, or to not install any system for capturing landfill gas.

**Major milestones**

**Table 5. Major Milestones achieved throughout CDM Project**

[complete the table below]

Milestone	Date Achieved	Comments

**Summary of the additionality analysis**

[provide summary]

**B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.**

Based on the methodology ACM0001 (Version 11.0) the following sources of emissions and respective greenhouse gases are identified for the CPA.

**complete the table below**

**Table 6. Sources and gases included in the project boundary**

Source	Gas	Included	Justification
Baseline Emissions from decomposition of waste at the landfill site	CH <sub>4</sub>	Yes	The major source of emissions in the baseline
	N <sub>2</sub> O	No	N2O emissions are small compared to CH4 emissions from landfills. Exclusion of this gas is conservative.
	CO <sub>2</sub>	No	CO2 emissions from the decomposition of organic waste are not accounted



Project Activity	Emissions from electricity consumption	CO <sub>2</sub>	Yes	Electricity may be consumed from the grid or generated onsite/offsite in the baseline scenario
		CH <sub>4</sub>	No	Excluded for simplification. This is conservative.
		N <sub>2</sub> O	No	Excluded for simplification. This is conservative.
		CO <sub>2</sub>	Yes	May be an important emission source
		CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small.
		N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small.
	CO <sub>2</sub>	Yes	May be an important emission source	
	CH <sub>4</sub>	No	Excluded for simplification. This emission source is assumed to be very small.	
	N <sub>2</sub> O	No	Excluded for simplification. This emission source is assumed to be very small.	

CPA [CPA number] is located within geographical boundary of the PoA, i.e. in the Republic of South Africa. The project boundary of the CPA [CPA number] is presented on the scheme below.

[provide scheme]

Figure 3. Graphical representation of the project boundary

**B.5. Emission reductions:**

**B.5.1. Data and parameters that are available at validation:**

Data / Parameter:	ID. 1./ Regulatory requirements relating to landfill gas
Data unit:	-
Description:	Regulatory requirements relating to landfill gas
Source of data used:	Publicly available information of the host country’s regulatory requirements relating to landfill gas
Value applied:	Will be reflected in MD <sub>BL,y</sub> , which for the first crediting period is zero
Justification of the choice of data or description of measurement methods and procedures actually applied :	The draft ‘Minimum Requirements for Waste Disposal by Landfill’ published in 2005 constitutes the most recent legislation on landfill site management in South Africa. They do not specify that it is a mandatory requirement to actively capture, flare or destroy landfill gas at every landfill in South Africa. They mainly provide guidelines to ensure safety by limiting landfill gas accumulation via passive ventilation. The Landfill Permit for the site, which specifies specific regulatory requirements for the site, does not mandate that any landfill gas must be captured or flared. <sup>5</sup> The information will be recorded annually, however it will only be used for changes to MD <sub>BL,y</sub> at the renewal of the crediting period. At the time of renewal of crediting period, ER shall be calculated accordingly in case new regulations are formulated requiring mandatory capture, flaring or destruction of LFG.
Any comment:	Further information in Section B.5.2

<sup>5</sup> Department of Water Affairs and Forestry, 1998: Permit Number 16/2/7/U203/D3/Z1/P64 New England Road Landfill Site.



<b>Data / Parameter:</b>	<b>ID. 2./ GWP<sub>CH4</sub></b>
Data unit:	tCO <sub>2</sub> e/tCH <sub>4</sub>
Description:	Global warming potential of CH <sub>4</sub>
Source of data used:	IPCC
Value applied:	21
Justification of the choice of data or description of measurement methods and procedures actually applied :	21 for the first commitment period. Shall be updated according to any future COP/MOP decisions
Any comment:	

<b>Data / Parameter:</b>	<b>ID.3./ D<sub>CH4</sub>; ρ<sub>CH4,n</sub></b>
Data unit:	tCH <sub>4</sub> /m <sup>3</sup> CH <sub>4</sub>
Description:	Methane density
Source of data used:	ACM0001 version 11.0
Value applied:	At standard temperature and pressure (0 degree Celsius and 1,013 bar) the density of methane is 0.0007168 tCH <sub>4</sub> /m <sup>3</sup> CH <sub>4</sub>
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	The parameter ρ <sub>CH4,n</sub> refers to density of methane that will be used to calculate <i>ex-post</i> project emissions from flaring

<b>Data / Parameter:</b>	<b>ID.4./ CEF<sub>elec,BL,y</sub>; EF<sub>grid,CM,y</sub></b>
Data unit:	tCO <sub>2</sub> e/MWh
Description:	CO <sub>2</sub> emissions intensity of the baseline source of electricity displaced
Source of data used:	See calculations in Section E.6.2. of the PoA-DD
Value applied:	0.949
Justification of the choice of data or description of measurement methods and procedures actually applied:	Calculated using the <i>Tool to calculate the emission factor for an electricity system</i> (Version 02.2.1)
Any comment:	This parameter refers to the combined margin emission factor of the South African grid ( <i>EF<sub>grid,CM,y</sub></i> )and is determined ex-ante for the whole crediting period.It is also used as <i>CEF<sub>elec,BL,y</sub></i> in calculations of baseline emissions.

<b>Data / Parameter:</b>	<b>ID.5./ φ</b>
Data unit:	-
Description:	Model correction factor to account for model uncertainties



Source of data used:	<i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 05.1.0)</i>
Value applied:	0.9
Justification of the choice of data or description of measurement methods and procedures actually applied:	The default value is used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 05.1.0)</i>
Any comment:	

<b>Data / Parameter:</b>	<b>ID.6./ f</b>
Data unit:	-
Description:	Fraction of methane captured at the SWDS and flared, combusted or used in another manner
Source of data used:	Written information from the operator of the solid waste disposal site and/or site visits at the solid waste site
Value applied:	0
Justification of the choice of data or description of measurement methods and procedures actually applied:	Value is applied since there is no capture of landfill gas at [landfill name] Landfill. The default value is used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site (Version 05.1.0)</i>
Any comment:	

<b>Data / Parameter:</b>	<b>ID.7./ OX</b>
Data 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 used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[Use 0.1 for managed solid waste disposal sites that are covered with oxidizing material such as soil or compost. Use 0 for other types of solid waste disposal sites]
Justification of the choice of data or description of measurement methods and procedures actually applied:	[provide explanation]
Any comment:	

<b>Data / Parameter:</b>	<b>ID.8./ F</b>
Data unit:	-
Description:	Fraction of methane in the SWDS gas (volume fraction)
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5



Justification of the choice of data or description of measurement methods and procedures actually applied:	The default value is used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version 05.1.0)
Any 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>ID.9./ DOC<sub>f</sub></b>
Data unit:	-
Description:	Fraction of degradable organic carbon (DOC) that can decompose
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	0.5
Justification of the choice of data or description of measurement methods and procedures actually applied:	The default value is used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version 05.1.0)
Any comment:	

<b>Data / Parameter:</b>	<b>ID.10./ MCF</b>
Data unit:	-
Description:	Methane correction factor
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories
Value applied:	[as per <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> ]
Justification of the choice of data or description of measurement methods and procedures actually applied:	The default value for [type of landfill] solid waste disposal sites is used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version 05.1.0) as there is [provide explanation why chosen value is appropriate]
Any comment:	

<b>Data / Parameter:</b>	<b>ID.11./ DOC<sub>j</sub></b>
Data unit:	-
Description:	Fraction of degradable organic carbon (by weight) in the waste type <i>j</i>
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Tables 2.4 and 2.5)
Value applied:	The following values of DOC <sub>j</sub> are applied based on the CPA landfill specific conditions:



	Waste type <i>j</i>	DOC <sub><i>j</i></sub> (% wet waste)	DOC <sub><i>j</i></sub> (% dry waste)
	Wood and wood products	43	50
	Pulp, paper and cardboard (other than sludge)	40	44
	Food, food waste, beverages and tobacco (other than sludge)	15	38
	Textiles	24	30
	Garden, yard and park waste	20	49
	Glass, plastic, metal, other inert waste	0	0
	[indicate which values will be used]		
Justification of the choice of data or description of measurement methods and procedures actually applied :	The default values are used according to the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version05.1.0).		
Any comment:			

<b>Data / Parameter:</b>	<b>ID.12./ k<sub><i>j</i></sub></b>
Data unit:	-
Description:	Decay rate for the waste type <i>j</i>
Source of data used:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories (adapted from Volume 5, Table 3.3)
Value applied:	The following values of DOC <sub><i>j</i></sub> are applied based on the CPA landfill specific conditions:



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, sewage sludge, beverages and tobacco	0.06	0.185	0.085	0.40

NB: MAT – mean annual temperature, MAP – Mean annual precipitation, PET – potential evapotranspiration. MAP/PET is the ratio between the mean annual precipitation and the potential evapotranspiration.  
 [indicate which values will be applied]

Justification of the choice of data or description of measurement methods and procedures actually applied :  
 The default value is used according to the *Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site* (Version 05.1.0)

Any comment:  
 The average temperature for [location] is [temperature] °C<sup>6</sup>  
 The 5 years average rainfall recorded on site is [rainfall value] mm<sup>7</sup>

<b>Data / Parameter:</b>	<b>ID. 13./ W<sub>x</sub></b>
Data unit:	Tonnes
Description:	The amount of waste disposed in the CPA landfill in year <i>x</i>
Source of data used:	CPA owner
Value applied:	[complete the table below] <b>Table 7</b>

<sup>6</sup> provide source

<sup>7</sup> provide source



	Year	tonnes	Year	tonnes	
Justification of the choice of data or description of measurement methods and procedures actually applied :	Data shall be taken from historical records of landfill operation and aggregated annually.				
Any comment:	This is determined once <i>ex-ante</i> for the purpose of estimating emission reductions.				

<b>Data / Parameter:</b>	<b>ID. 14./ <math>\eta_{flare,h}</math></b>
Data unit:	-
Description:	Flare efficiency in the hour <i>h</i>
Source of data used:	<i>Tool to determine project emissions from flaring gases containing methane (Version 01)</i>
Value applied:	90%
Justification of the choice of data or description of measurement methods and procedures actually applied:	Please revert to Section E.6.2 of the PoA-DD (Step 6. Determination of the hourly flare efficiency, page 23)
Any comment:	





**B.5.2. Ex-ante calculation of emission reductions:**

**Baseline emissions**

1. Calculation of methane emissions avoided during the year *y* from preventing waste disposal at the solid waste disposal site

Input data								
$\varphi = 0.9$								
$f = 0$								
$GWP_{CH_4} = 21 \text{ tCO}_2\text{e/tCH}_4$								
OX = [XX]								
$F = 0.5$								
$DOC_f = 0.5$								
MCF = [XX]								
$W_{j,x}$ = please refer to parameter ID.13 for values								
$DOC_j$ = please refer to parameter ID.11 for values marked with red box								
$k_j$ = please refer to parameter ID.12 for values marked with red box								
Calculations								
Equation (3) in PoA-DD: $BE_{CH_4,SWDS,y} = \varphi \cdot (1-f) \cdot GWP_{CH_4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j \cdot (y-x)} \cdot (1 - e^{-k_j})$								
Results								
<b>Table 8. Methane emissions avoided during the year <i>y</i> from preventing waste disposal at the solid waste disposal site</b>								
Year	[year]	[year]	[year]	[year]	[year]	[year]	[year]	[year]
$BE_{CH_4,S}$ $WDS,y$ [tCO <sub>2</sub> e]								

2. Calculations of the amount of methane utilised in the project scenario



Input data								
BE <sub>CH4,SWDS,y</sub> = Table7. Methane emissions avoided during the year y from preventing waste disposal at the solid waste disposal site								
GWP <sub>CH4</sub> = 21 tCO <sub>2</sub> e/tCH <sub>4</sub>								
Calculations								
Equation (2) in PoA-DD: $MD_{project,y} = BE_{CH4,SWDS,y} / GWP_{CH4}$								
Results								
<b>Table 9. The amount of methane utilised in the project scenario</b>								
year	[year]	[year]	[year]	[year]	[year]	[year]	[year]	[year]
MD <sub>project,y</sub> [tCH <sub>4</sub> ]								

3. Calculation of baseline emissions

Input data
MD <sub>project,y</sub> = Table 8. The amount of methane utilised in the project scenario
MD <sub>BL,y</sub> = 0
GWP <sub>CH4</sub> = 21 tCO <sub>2</sub> e/tCH <sub>4</sub>
EL <sub>LFG,y</sub> = [XX] MWh/year
CEF <sub>elec,BL,y</sub> = EF <sub>grid,CM,y</sub> = 0.949 tCO <sub>2</sub> /MWh
Calculations
Equation (1) in PoA-DD: $BE_y = (MD_{project,y} - MD_{BL,y}) * GWP_{CH4} + EL_{LFG,y} \cdot CEF_{elec,BL,y}$
Results



**Table 10. Baseline emissions**

Year	[year]	[year]	[year]	[year]	[year]	[year]	[year]	[year]
BE <sub>y</sub> [tCO <sub>2</sub> e]								

**Project emissions**

4. Calculations of emissions from consumption of electricity in the project case

[provide explanation which option is used to determine the emission factor for electricity generation based on the *Tool to calculate baseline, project and/or leakage emissions from electricity consumption*]

Input data								
EC <sub>PJ,i,y</sub> = [XX] MWh/year								
EF <sub>grid,CM,y</sub> = 0.949 tCO <sub>2</sub> /MWh								
TDL <sub>i,y</sub> = [XX]%								
Calculations								
Equation (18) in PoA-DD: $PE_{EC,y} = EC_{PJ,i,y} * EF_{grid,CM,y} * (1 + TDL_{i,y})$								
Results								
Table 11. Emissions from consumption of electricity in the project case								
year	[year]	[year]	[year]	[year]	[year]	[year]	[year]	[year]
PE <sub>y</sub> [tCO <sub>2</sub> e]								

[add other calculations of project emissions if needed]

**Emission reductions**

5. Calculation of emission reductions

Input data	
BE <sub>y</sub>	Table 9. Baseline emissions
PE <sub>y</sub> = PE <sub>EC,y</sub>	Table 10. Emissions from consumption of electricity in the project case



Calculations								
Equation (20) in PoA-DD: $ER_y = BE_y - PE_y$								
Results								
<b>Table 12. Emission reductions</b>								
Year	[year]	[year]	[year]	[year]	[year]	[year]	[year]	[year]
ER <sub>y</sub> [tCO <sub>2</sub> e]								

**B.5.3. Summary of the ex-ante estimation of emission reductions:**

**Table 13. Summary of ex-ante estimation of emission reductions**

Year	Estimation of project activity emissions (tonnes of CO <sub>2</sub> e)	Estimation of baseline emissions (tonnes of CO <sub>2</sub> e)	Estimation of leakage (tonnes of CO <sub>2</sub> e)	Estimation of overall emission reductions (tonnes of CO <sub>2</sub> e)
[year]				
[year]				
[year]				
[year]				
[year]				
[year]				
[year]				
[year]				
<b>Total</b> (tonnes of CO <sub>2</sub> e)				

**B.6. Application of the monitoring methodology and description of the monitoring plan:**

**B.6.1. Description of the monitoring plan:**

[provide detailed description of the monitoring procedure]

Please see Annex 4 of the PoA-DD for details.

[add other or remove monitored parameters if relevant to the CPA]



**Data and parameters monitored**

<b>Data / Parameter:</b>	<b>ID.15./ LFG<sub>total,y</sub></b>
Data unit:	Nm <sup>3</sup>
Description:	Total amount of landfill gas captured at Normal Temperature and Pressure
Source of data to be used:	CPAowner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Measured continuously by a flow meter (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions). Data to be aggregated monthly and yearly
QA/QC procedures to be applied:	Flow meters should be subject to a regular maintenance and testing regime to ensure accuracy
Any comment:	Since a flow meter is used that automatically measures flow in Normalized cubic meters, the parameters for temperature and pressure will not be monitored.

<b>Data / Parameter:</b>	<b>ID.16./ LFG<sub>flare,y</sub>; FV<sub>RG,h</sub></b>
Data unit:	Nm <sup>3</sup>
Description:	Amount of landfill gas flared at Normal Temperature and Pressure
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Measured continuously by a flow meter (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions). Data to be aggregated monthly and yearly.
QA/QC procedures to be applied:	Flow meters should be subject to a regular maintenance and testing regime to ensure accuracy
Any comment:	Since a flow meter is used that automatically measures flow in Normalized cubic meters, the parameters for temperature and pressure will not be monitored.  The parameter FV <sub>RG,y</sub> refers to Volumetric flow rate of the residual gas in dry basis at normal conditions in hour <i>h</i> that will be used to calculate <i>ex-post</i> project emissions from flaring

<b>Data / Parameter:</b>	<b>ID.17./ LFG<sub>electricity,y</sub></b>
Data unit:	Nm <sup>3</sup>
Description:	Amount of landfill gas combusted in power plant at Normal Temperature and



	Pressure
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Measured continuously by a flow meter (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions). Data to be aggregated monthly and yearly.
QA/QC procedures to be applied:	Flow meters should be subject to a regular maintenance and testing regime to ensure accuracy
Any comment:	Since a flow meter is used that automatically measures flow in Normalized cubic meters, the parameters for temperature and pressure will not be monitored.

<b>Data / Parameter:</b>	<b>ID.18./ T<sub>flare</sub></b>
Data unit:	°C
Description:	Temperature in the exhaust gas of the flare
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Continuous monitoring of the temperature in the exhaust gas with a type N thermocouple as described in the <i>Tool to determine project emissions from flaring gases containing methane</i> .
QA/QC procedures to be applied:	The thermocouple will be subject to exchange and/or calibration on an annual basis to ensure accuracy.
Any comment:	

<b>Data / Parameter:</b>	<b>ID. 19./ T</b>
Data unit:	°C
Description:	Temperature of the landfill gas
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods	Continuously measured to determine the density of methane D <sub>CH<sub>4</sub></sub> . No separate monitoring of temperature is necessary when using flow meters that



and procedures to be applied:	automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
QA/QC procedures to be applied:	Measuring instruments should be subject to a regular maintenance and testing regime in accordance to appropriate national/international standards
Any comment:	In case of the use of a flow meter that automatically measure temperature and pressure, this parameter will not be monitored.

<b>Data / Parameter:</b>	<b>ID. 20. / P</b>
Data unit:	Mbar
Description:	Pressure of the landfill gas
Source of data to be used:	Project Participant
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Measured continuously to determine the density of methane $D_{CH_4}$ . No separate monitoring of pressure is necessary when using flow meters that automatically measure temperature and pressure, expressing LFG volumes in normalized cubic meters.
QA/QC procedures to be applied:	Maintenance of equipment will be carried out according to the instructions of the manufacturer.
Any comment:	In case of the use of a flow meter that automatically measure temperature and pressure, this parameter will not be monitored.

<b>Data / Parameter:</b>	<b>ID.21./ <math>w_{CH_4}</math>; <math>f_{V_{CH_4, RG, y}}</math></b>
Data unit:	$m^3 CH_4/m^3$ LFG
Description:	Methane fraction in the landfill gas
Source of data to be used:	To be measured continuously by CPA owner using certified equipment
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A. as it is only used in <i>ex-post</i> calculations
Description of measurement methods and procedures to be applied:	Measured by continuous gas quality analyser (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)
QA/QC procedures to be applied:	The gas analyser should be subject to a regular maintenance and testing regime to ensure accuracy
Any comment:	The parameter $f_{V_{CH_4, RG, y}}$ refers to volumetric fraction of methane in the residual gas on dry basis in hour <i>h</i> that will be used to calculate <i>ex-post</i> project emissions from flaring



<b>Data / Parameter:</b>	<b>ID. 22./ Operating time of the power plant</b>
Data unit:	Hours
Description:	Operation of the power plant
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[XX]
Description of measurement methods and procedures to be applied:	Monitored annually.
QA/QC procedures to be applied:	
Any comment:	This is monitored to ensure methane destruction is claimed for methane used in electricity plant when it is operational

<b>Data / Parameter:</b>	<b>ID.23./ EL<sub>LFG,y</sub></b>
Data unit:	MWh/year
Description:	Net amount of electricity generated using LFG
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[XX]
Description of measurement methods and procedures to be applied:	Measured by continuous electricity meter (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)
QA/QC procedures to be applied:	Electricity meter will be subject to regular (in accordance with stipulation of the meter supplier) maintenance and testing to ensure accuracy
Any comment:	Required to estimate the emission reductions from electricity generation from LFG, if credits are claimed

<b>Data / Parameter:</b>	<b>ID.24./ EC<sub>PJ,y</sub></b>
Data unit:	MWh/year
Description:	Quantity of electricity consumed by the project in year y
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in	[XX]





section B.5	
Description of measurement methods and procedures to be applied:	Measured by continuous electricity meter (average value in a time interval not greater than an hour shall be used in the calculations of emission reductions)
QA/QC procedures to be applied:	Electricity meter will be subject to regular (in accordance with stipulation of the meter supplier) maintenance and testing to ensure accuracy
Any comment:	This parameter is used to calculate $PE_{EC,y}$

<b>Data / Parameter:</b>	<b>ID.25./ <math>MG_{PR,y}</math></b>
Data unit:	tCH <sub>4</sub>
Description:	Amount of methane generated during year <i>y</i> of the project activity
Source of data to be used:	CPA owner
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N.A.
Description of measurement methods and procedures to be applied:	Monitored annually. <i>Ex-ante</i> values are estimated using the actual amount of waste disposed in the landfill as per the latest version of the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version [XX])
QA/QC procedures to be applied:	As per the latest version of the <i>Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site</i> (Version [XX])
Any comment:	

<b>Data / Parameter:</b>	<b>ID.26./ <math>TDL_{j,y}</math></b>
Data unit:	%
Description:	Average technical transmission and distribution losses for providing electricity to source <i>j</i> in year <i>y</i>
Source of data to be used:	Eskom [the latest year available] Annual Report, page [page number](provide hyperlink)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[XX]
Description of measurement methods and procedures to be applied:	Monitored annually. In the absence of data from the relevant year, most recent figures should be used, but not older than 5 years.
QA/QC procedures to be applied:	
Any comment:	Eskom generates approximately 95% of the electricity used in South Africa. Core business of Eskom is electricity generation, transmission, trading and distribution.



Therefore, it's a reliable source of data.

### SECTION C. Environmental analysis

**C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:**

Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

**C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

*[provide description and conclusions of the EIA]*

**C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA):**

*[provide answer]*

### SECTION D. Stakeholders' comments

**D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

**D.2. Brief description how comments by local stakeholders have been invited and compiled:**

*[provide description]*

**D.3. Summary of the comments received:**

During the stakeholder consultation meeting the following questions and comments were made<sup>8</sup>.

*[provide summary]*

**D.4. Report on how due account was taken of any comments received:**

*[provide description]*

<sup>8</sup>The minutes of the local stakeholder meeting will be made available to the DOE during validation.



Annex 1

**CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA**

Organization:	
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	



Annex 2

**INFORMATION REGARDING PUBLIC FUNDING**

The CPA [CPA number] “Landfill gas capture and utilisation project at [landfill name] Landfill” does not make use of public funding.



Annex 3

**BASELINE INFORMATION**

Baseline information for calculation of the South Africa grid emission factor is presented in Annex 3 of the PoA-DD.



Annex 4

**MONITORING INFORMATION**

See Annex 4 of PoA-DD

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