Clean Development Mechanism South Africa
Designated National Authority

energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

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Project Design Document (PDD)

Project reference number (office	
Date received (office use only)	

NOTES ON COMPLETING THIS PROJECT DESIGN DOCUMENT

1. Please provide this PDD in both hard-copy

Part A: Project Proponent Details

Project Name	City of Cape Town Landfill Gas Extraction and Utilization Programme of Activities (PoA), and Coastal Park Landfill Clean Development Mechanism Programme Activity (CPA)
Date of Submission of PDD	19th April 2012

Project Developer	
Name	City of Cape Town
Organizational Category	Municipality
Legal Status	Local Government
Street Address	City of Cape Town 9th Floor Civic Centre 12 Hertzog Boulevard Cape Town Republic of South Africa
Postal Address (if different from above)	PO Box 298 Cape Town

	8000 Republic of South Africa
Website Address	http://www.capetown.gov.za/
Main Activities	The City of Cape Town is responsible for the funding and management of all the municipal activities in the region including air quality control and monitoring; electricity services; solid waste management; water and sanitation services; municipality budget and by-laws; catchment, storm-water and river management; cemeteries; City health; City parks; environmental management; fire and rescue; human settlements; land use; planning and building development; tourism and events management; social and community development services; transportation, highways and traffic management and metro policing.
Summary of Financial Performance in last fiscal year	The last published financial summary for the year ended 30 June 2010 (City of Cape Town: Annual Financial Statement) Total Assets : R 28,882,077,000 Total Liabilities 14,231,070,000 Total Revenue (Actual) R 18,540,505,000 Total Expenditure (Actual) R 16,434,931,000 Cash and cash Equivalents at the end of the year: R 4,486,176,000
Contact Person(s)	Barry Coetzee Manager: Technical Strategic Support, Utility Services
Telephone	Work: +27 +(0)21 400 2992 Cell: +27 +(0)83 232 2861
Fax	086 576 0260
Email Address	Barry.Coetzee@capetown.gov.za
Project Partners Provide the following Information for **all** project partners (copy and paste relevant sections of the table if information is to be provided on more than one partner organisation)	
Name	Not Applicable. There are no Project Partners
Nature of partner	n/a
Organizational Category	n/a
Legal Status (if private company)	n/a
Street Address	n/a
Postal Address (if different to Street Address)	n/a
Website Address	n/a
Main Activities	n/a
Contact Person(s)	n/a
Telephone	n/a
Fax	n/a
Email Address	n/a

Contractual Arrangements	
Contractual arrangements between various entities involved	The City of Cape Town has engaged SLR Consulting (South Africa) (Proprietary) Limited to prepare and manage the Validation and Registration process for the Clean Development Mechanism (CDM) landfill gas Programme of Activities (PoA) project. SLR has engaged Carbon Check as the Designed Operational Entity (DOE) and IMBEWU Sustainability Legal Specialists (Pty) Ltd. as the CDM legal advisor. The City of Cape Town is seeking to engage a coordinating/managing entity (CME) through a procurement process.

Part B: Project Overview (Technical Summary, Location and Schedule)

Technical Summary of the project	
Objective of the Project	The project objective is to capture and combust landfill gas (LFG) to generate "green energy" (electricity and heat) at solid waste disposal sites (landfills) in the municipality of Cape Town, South Africa.

Project Description

Each CPA under the proposed PoA will comprise the controlled extraction and collection of LFG, which will subsequently be combusted via a combination of flaring and use for either electricity generation or as a source of heat. For sites where the main objective is to generate electricity LFG will be burnt in a Combined Heat and Power (CHP) engine to generate electricity. For the distribution of electricity to the South African grid network transformer equipment and switchgear will be utilised. For sites where biogas is distributed to off site industrial energy users additional pipework to transport collected gas to the designated off-site end user will be installed. In addition further blowers will be installed to ensure suitable rates of gas delivery (if required). Each CPA site will also be provided with an enclosed landfill gas flaring system which will be used to combust any gas which cannot otherwise be used to generate electricity or produce heat in the nearby industrial process.

The first CPA under this PoA will capture and utilize landfill gas at Coastal Park landfill. The Coastal Park landfill has been operational since 1985 and is expected to serve a major role in the future disposal of the City's waste because of its strategic geographical location and relatively long lifespan, anticipated to be until at least 2020. The site currently receives approximately 450,000 tonnes of waste per year comprising general municipal waste, garden refuse and builders' rubble which is compacted in place.

The landfill gas which is currently produced by the site is neither collected nor flared/utilised, but vents to the atmosphere. The site is owned and operated by the City of Cape Town and therefore the rights to extract and utilise the landfill gas are already established.

The Coastal Park CPA consists of controlled capture of landfill gas using the following items of equipment:

- A network of vertical and horizontal landfill gas collection wells installed within the waste;
- Landfill gas collection pipework connected to the wells, which will draw the collected gas back to a single location (gas compound);
- Blowers to apply suction to the pipework, allowing the landfill gas to be extracted;
- Condensate management systems to remove excess liquid from the gas collection pipework; and
- An enclosed compound area which will provide the focal point for gas collection and also house associated monitoring instrumentation and recording systems as required to monitor the CPA.

Once the landfill gas has been captured, it will be conditioned and combusted on-site to produce electricity which will be exported to the local grid supply network. The additional items of equipment to be provided will comprise:

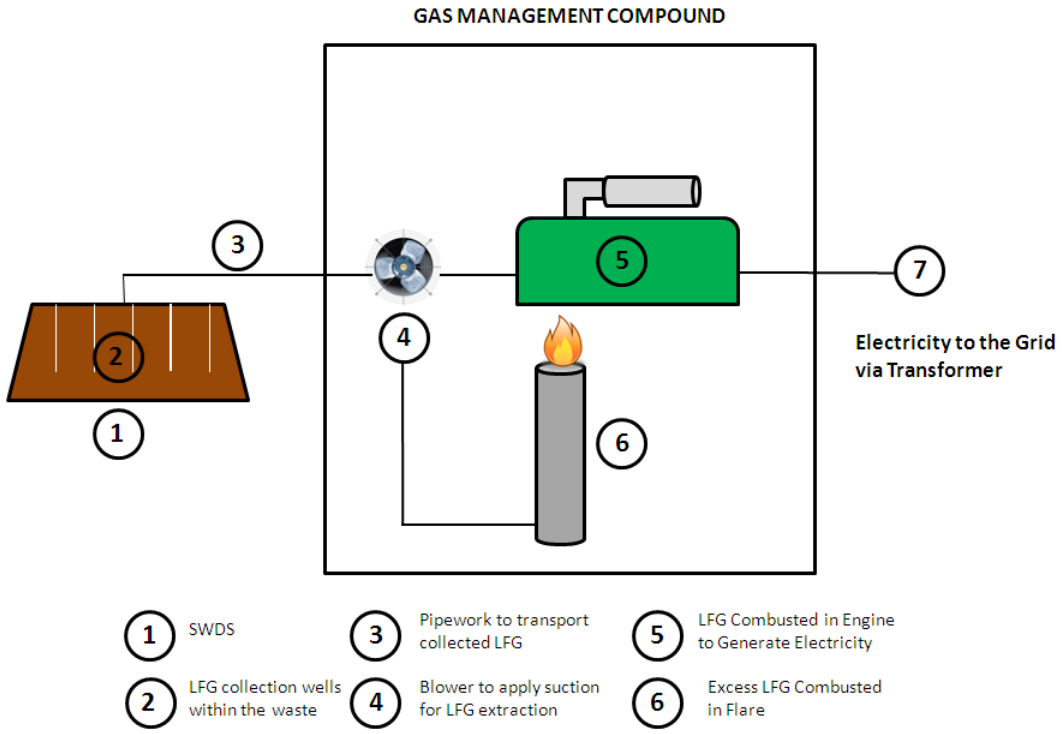
- Two 1MW landfill gas engines sufficient to optimise utilisation of LFG for electricity generation; and
- Electricity transformers, cables, switchgear and control gear which will deliver power into the grid.

The Coastal Park site will also be provided with an enclosed landfill gas flaring system which will be used to combust any gas which cannot otherwise be used to generate electricity. The flaring system will include the following items of equipment:

Technical Summary of the project

- Enclosed flare to combustion the collected LFG in a controlled manner; and
- Equipment necessary to monitor the LFG composition (methane content, LFG flow rate and flare combustion temperature).

The general layout of the solid waste disposal site (SWDS) and installation for the capture and utilization of landfill gas is presented below:



Project Constraints

Are there any constraints affecting project operations or commissioning?

There are no known constraints affecting project operations or commissioning.

Technology to be employed	The technology to be employed is landfill gas collection and combustion with energy recovery. These systems are proven and widely used in Europe, North America, and other parts of the world. These systems are currently being introduced into South Africa. The first operational landfill gas to electricity project in South Africa was the eThekwini Municipality Mariannhill landfill which was registered with the UNFCCC in December 2006 (CDM0243). The Coastal Park project will be similar to this. Other landfill gas to electricity projects in South Africa include: • CDM0947: Durban Landfill-Gas Bisasar Road (6.5MW installed capacity) • CDM1382: EnviroServ Chloorkop Landfill Gas Recovery Project (flaring only) • CDM2588: Ekurhuleni Landfill Gas Recovery Project – South Africa (currently flaring only, potential for 1MW at two landfill sites)

Technical Summary of the project	
	• CDM3633: Alton Landfill Gas to Energy Project (potential for up to 0.5MW) There are currently no landfill gas heat recovery projects in South Africa but they are envisaged under the PoA.
Greenhouse Gases Targeted	Carbon dioxide (CO_2) and Methane (CH_4)
Emission reductions	The estimates for the annual emission reductions for the first three CPAs are a maximum of 385,000 tonnes CO_2 equivalent. The calculated annual emission reduction for Coastal Park for the first CPA 7 year crediting period is 124,604 tonnes CO_2 equivalent. The total for the 7 year crediting period is 817,732 tonnes CO_2 equivalent
Baseline & Additionality Assessment	Common practice within South Africa demonstrates that continuation of landfilling is the most viable option for disposal of municipal solid waste. The prevailing common practice in South Africa is to deposit waste in dumps or landfills without the controlled extraction and use of landfill gas. Gas may be vented to atmosphere to reduce its concentration below hazardous levels, but landfill gas capture is not commonly installed which is the current situation in Cape Town. Currently there is no legal requirement to install gas collection and extraction systems in South Africa. The proposed PoA is a voluntary coordinated action by the City of Cape Town; • There are no regulatory requirements in RSA regarding the capture and flaring or use of LFG and therefore such projects would not be implemented in the absence of the PoA; and • Prevailing practice in RSA is for waste to be deposited in landfills or dumpsites without landfill gas capture. This is the current situation in Cape Town. Additionality for the Coastal Park CPA has been calculated using the "Combined tool to identify the baseline scenario and assess additionality (Version 12.0.0)". The tool comprises of the following steps. • Step 0: Demonstration whether the proposed project activity is the First-of-its-kind • Step 1: Identification of alternative scenarios; • Step 2: Barrier analysis; • Step 3: Investment analysis (if applicable); and • Step 4: Common practice analysis. The internal rate of return (IRR) from the additionality calculation for a 21 year period is -0.1%. This demonstrates the Coastal Park project is additional.
Monitoring	Data and parameters that will be monitored include:

Technical Summary of the project	
	• Regulatory requirements for landfill gas management in RSA; • Global warming potential of methane, tCO_2e/tCH_4; • Fraction of methane that would be oxidised in the top layer of the SWDS in the baseline; • Net calorific value (energy content) of fossil fuel type *i* in year *y*, GJ/mass or volume unit; • Amount of fossil fuel type *i* consumed by power plant *m* in year *y*, mass or volume unit; • CO_2 emission factor of fossil fuel type *i* used in power units *m* in year *y*, tCO_2/GJ; • Default factor for the model correction factor to account for model uncertainties • Amount of methane in the LFG which is flared due to a requirement in year *y*, tCH_4/yr • Fraction of LFG that is required to be flared due to a requirement in year *y* • Volumetric fraction of greenhouse gas *i*/*k* (methane in both cases) in a time interval *t* on a wet basis, m^3 gas *i*/*k* / m^3 wet gas; • Mass flow of the gaseous stream (LFG) in time interval *t* on a wet basis, kg/h; • Volumetric fraction of methane in the residual gas in hour *h;* • Volumetric flow rate of the residual gas (LFG) in dry basis at normal conditions in the hour *h*, m^3/h; • Temperature in the exhaust gas of the flare, ºC; • All data and parameters for flare monitor according to the manufacturer's specification; • Average technical transmission and distribution losses for providing electricity to source *j* (project) and *k* (baseline) in year *y*, %; • Quantity of electricity consumed by the project electricity consumption source *j* in year *y*, MWh/yr; • Net amount of electricity generated using LFG, MWh/yr; • Operation of the energy plant, hr; • Emission Factor for electricity generation for source *k* in year *y*, tCO_2/MWh.
Type of project/activities	*Identify which type of activity is involved in this project – and for each, provide brief details*
a. Energy Supply	For the landfills in the PoA, the electricity generators will be in some cases embedded in the City's network and in others in Eskom's network, or the gas will be utilized off site. The City of Cape Town Electricity Services is a licensed (municipal) distributor which purchases electricity from the national generator Eskom and distributes and sells the electricity on to approximately 2/3rd's of the City of Cape Town's electricity consumers. The energy supply at Coastal Park will be 2MW electricity for 8,000 hours per year.
b. Energy Demand	Up to 50KW electricity demand for the operation of the landfill gas extraction and utilization system.
c. Industrial Process	Not Applicable

Technical Summary of the project	
d. Transport	Not Applicable
e. Waste Management	Capture of landfill methane emissions through the installation of a collection systems.
f. Forestry/ land use	Not Applicable
g. Other	Not Applicable

Project Boundary

In accordance with methodology ACM0001 Version 12.0.0, the project boundary of the project activity (CPA) shall include the site where the LFG is captured and, as applicable:

- Sites where the LFG is flared or used;
- Captive power plants or power generation sources connected to the grid or a third party, which are supplying electricity to the project activity;
- Captive power plants or power generation sources connected to the grid or a third party, which are supplying electricity in the baseline that is displaced by electricity generated by captured LFG in the project activity; and
- Heat generation equipment or sources which are supplying heat in the baseline that is displaced by heat generated by captured LFG in the project activity

Please see Figure 1 and 2 below for schematic presentation of projects boundaries. The schematic presentations do not illustrate all options for the use of electricity and energy on and off site:

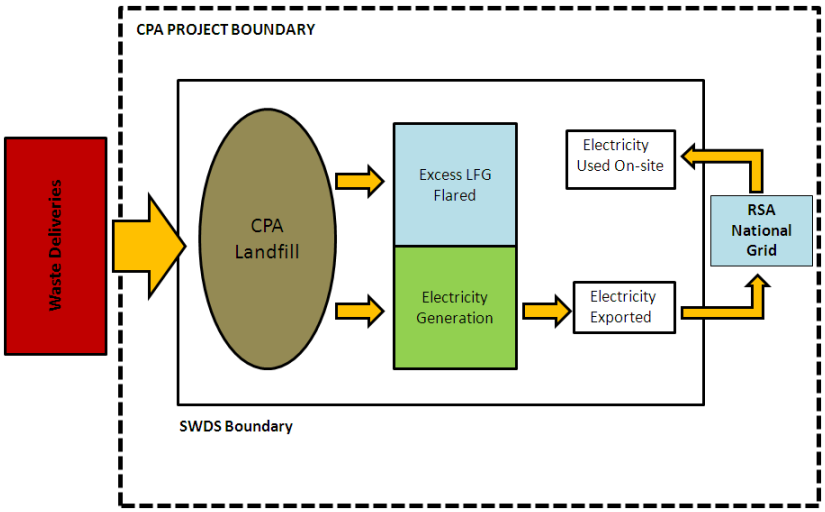
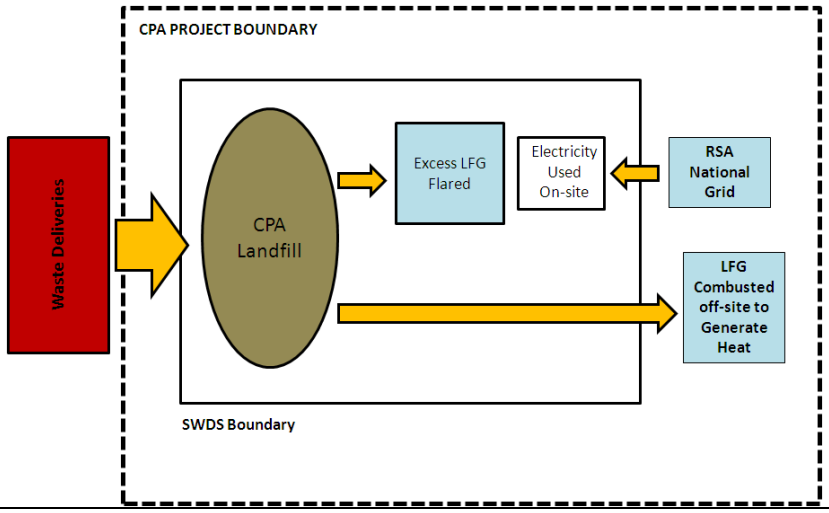
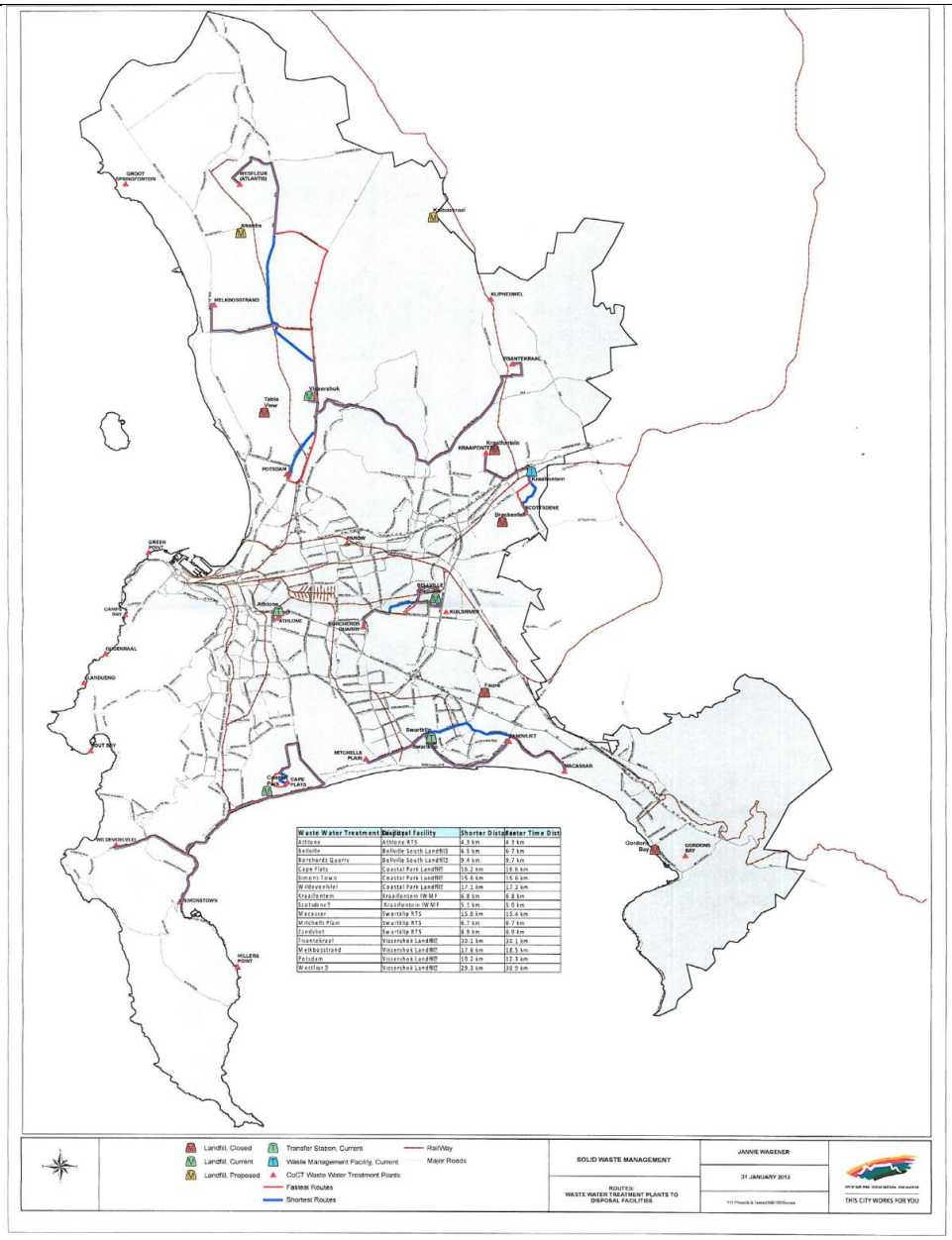


Figure 1: Schematic Representation of the Project Boundary (Electricity Generation)



Technical Summary of the project	
Figure 2: Schematic Representation of the Project Boundary (Heat Generation)	
Indicate Emissions outside the Project Boundary	There are not significant and measureable net emissions that are attributable to the projects outside the Project Boundary.

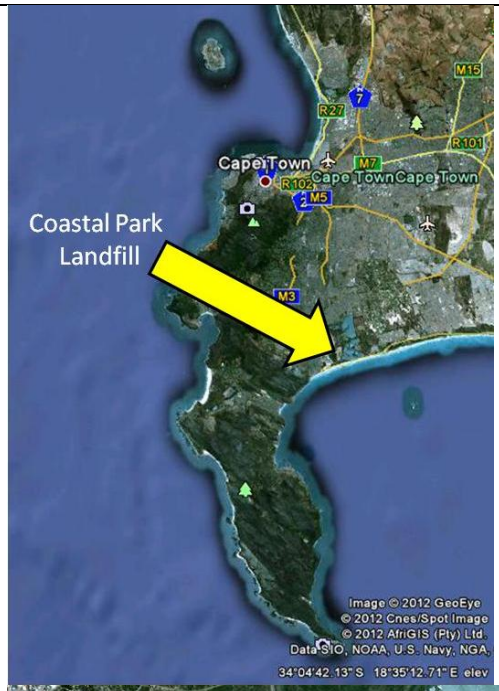
Location of the Project	
Province	Western Cape
Municipality	The CPAs included in the landfill PoA project will be implemented within the municipal boundary for the City of Cape Town. The exception is the potential site at Kalbaskraal which is adjacent to the City boundary. The Coastal Park CPA is within the City of Cape Town boundary.
Nearest city/large town	Cape Town
Brief description of the location of the project site	The locations of the potential landfill gas CPAs are: • Bellville South landfill; • Coastal Park landfill; • Vissershok landfill; • Atlantis landfill (alternative: Kalbaskraal pending MEC's environmental authorization); • Kalbaskraal landfill (alternative: Atlantis pending MEC's environmental authorization); • Brackenfell landfill; • Faure landfill; • Gordon's Bay landfill; • Swartklip landfill. The sites are shown on the map below:



The Coastal Park Landfill which is the first CPA is located at:

Coastal Park Landfill
Baden Powell Drive
Strandfontein/Muizenberg

The landfill site is located east of Muizenberg in the South Peninsula area adjacent to Strandfontein in the Cape Town municipal area. The site occupies approximately 62 ha. The Coastal Park landfill serves the broader southern suburbs of the CMA and has GPS co-ordinates of 34°05'13.29"S 18°30'05.20"E. The location of the site is presented below.



Project Schedule/Timetable	
Earliest Project Start Date	The earliest project start date is UNFCCC Registration 1st September 2012.
When is the expected first year of CER delivery	The starting date of the crediting period is 1st July 2014
Project Lifetime	PoA 28 years. 21 years each CPA (7 years twice renewable).
Project End Date	August 2040

Project Schedule/Timetable	
Crediting Period	7 years twice renewable i.e. 21 years
Current Status or phase of the project	The current status of the project is advanced planning/preparation: • All plans detailing LFG extraction systems have been prepared. • Public consultation has been held • All Authorisations have been obtained The budget is subject to future decisions within the Municipality
DNA Approval	*Has this project been submitted to the DNA for approval previously?* No, this project has not been submitted to the DNA for approval previously
Approval by other bodies	*Has this project (or any elements of the project) been submitted to any other national, provincial or local government departments or agencies for regulatory or legal approval (excluding EIA process – see Part C). If so – provide brief details.* The Coastal Park Landfill, at which the first CPA is located, is duly authorised and has a permit in terms of Section 20 of the Environment Conservation Act No 73 of 1989, i.e., a waste management permit, reference 16/2/7/G203/D29/Z4/P377. This permit is included in the documentation submitted to the DNA as part of this application. The activity intended to be undertaken as the first CPA, which is a Category "A" Waste Management Activity in terms of the National Environmental Management: Waste Act No. 59 of 2008 requires a Waste Management License in terms of section 49(1)(a) of this Act, prior to (the activity's) commencement. This requirement for a Waste Management License triggers the further requirement for a Basic Assessment in terms of Chapter 5 of National Environmental Management Act No. 107 of 1998 (NEMA) read with the Regulations, promulgated under NEMA, which determine the process for undertaking a Basic Assessment, namely NEMA Regulation 544 of 2 August 2010. A Basic Assessment was duly undertaken and the first CPA (licated at Coastal Park Landfill) has duly obtained the required Waste Management License, with number 9/12/11/L334/9, which is included in the documentation submitted to the DNA as part of this application. Please also refer to Part C, below, which provides the DNA with the required explanation of how the PoA performs against the DNA's sustainable development criteria.

Part C: Performance Against the DNA's Sustainable Development Criteria

South Africa has identified the following sustainable development criteria and indicators against which each CDM project will be assessed. Please provide your interpretation of how this project will address each of these **criteria and indicators** where they are relevant to the project. If the space provided is not sufficient please append additional information as required.

NOTE: For all indicators which are of relevance to the project show how the performance of the project against these indicators can be objectively monitored and measured on an ongoing basis.

1. Economic: Does the project contribute to national economic development?

Please give details (1 paragraph)

The PoA project has significant importance in national economic development. Current national economy is heavily dependent on energy. This energy demand is likely to increase. In order to support sustainable development and growth it is vital that energy required for progress is sourced from renewable or green sources. Generating power from LFG is considered to be green as it does not rely on natural resources. The expected power generation from the PoA is at least 6MW equivalent which displaces significant amount of coal for electricity generation and other fossil fuel use. In addition the project will contribute to national and local economic development by bringing foreign exchange into the country through the sale of carbon credits (Certified Emission Reductions, (CERs)). Contributions to economic development will be achieved through the creation of employment opportunities during the construction and installation of gas collection infrastructure, CHP facility, grid connection etc. The skills transfer and capacity building associated with the project are also considered as benefits to economic development.

2. Social: Does the project contribute to social development in South Africa?

Please give details (1 paragraph)

During construction and installation phase of each CPA, the project will enable local building companies to sustain and even grow employment ratios on all professional, skilled and unskilled levels. The project will also impact on additional companies providing consultation, raw materials and transportation to the project. Once the Project is installed on a CPA level, it will result in the creation of some skilled professional-level jobs, which may be achieved by further education and professional development of current staff. In addition technician-level jobs and semi-skilled/unskilled jobs will be required for the onsite maintenance and operation of the proposed LFG collection and processing infrastructures. The overall PoA project's contribution to employment and the associated multiplier effect of these jobs is difficult to monitor. There will be direct employment and training of local personnel, and indirect employment opportunities.

3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development?

Please provide **brief** comment for each of these below.

i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	The location for all of the proposed LFG collection installations are within an existing or new landfill site. The LFG collection systems, CHP compounds, pipe installations to offsite locations and the electric transformation units themselves expected to contribute very little to the landfill site's disturbance to ecosystems and they are unlikely to cause any loss of biodiversity. All is to be designed

	to minimise the disturbance of ecosystems and loss of biological diversity.
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	The normal operation of the LFG collection and transportation system does not result in pollution or degradation of the environment. The LFG collection system will improve the local environment by the collection of odorous and hazardous LFG, and the global environment by the combustion of the greenhouse gas with energy recovery. All condensate collected from the pipe systems will be treated and/or disposed to sewer. The CHP engine design enables the high temperature gas combustion that effectively destroys any potential pollutants. The CHP exhaust stack will point in an upward position at elevated levels to enable the easy dispersion of unavoidable emissions. All CHP units will be enclosed in units that are acoustically designed for noise reduction. All CHP engines, electrical transformers will be installed in a concrete, bunded area ensuring containment of any accidental (oil) spillage. All construction, maintenance and operations will be carried out by qualified trained personnel according to a site management and maintenance plan and by specification of the manufacturer to avoid and minimize any pollution to the environment.
iii) That the **disturbance of landscapes and sites that constitute the nation's cultural heritage** is avoided, or where it cannot be altogether avoided, is minimised and remedied	The location for all of the proposed LFG collection installations are within an existing or new landfill site which have been carefully assessed through Environmental Authorisations. Due to the small footprint and low elevations there should be minimal or no additional visual impact to the landfill sites as a result of the LFG management systems
iv) That **waste is avoided**, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner	It is anticipated that the PoA will generate very little or no waste during operation. However, some waste will be generated during construction and installation phase. Any waste associated with the construction and installation of each CPA is to be handled in line with site-specific Environmental and Waste Management Programme. Waste will be reused or recycled on site as far as possible, or collected and transported to an approved and certified recycling/treatment or disposal facility.
v) That **the use and exploitation of non-renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource	It is anticipated that the PoA will not use or exploit non-renewable resources. Nevertheless, materials used for construction and for the installations (i.e. plastic pipes, electric motors, CHP engines, concrete) may use non renewable resources like concrete, plastic and metals. However all of these materials are highly recyclable and most of them are manufactured using recycled materials. In addition all installations have a long operational life beyond 10 years which reduces the need for frequent replacement.
vi) That the **development, use and exploitation of renewable resources is responsible and equitable**, and takes into account the consequences of the depletion of the resource.	Landfill gas is internationally considered as a renewable resource of energy. This project will capture the emission of this renewable resource and prevent it damaging the atmosphere as a greenhouse gas.
vii) That **a risk averse and cautious**	The proposed installations by the PoA are technologically proven

approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions	and have been widely used over decades in Europe and worldwide. Hence, technological and operational risks associated Technology risks in the PoA are negligible. Previous experience of construction and installation contractors for each CPA installation will be required to reduce construction and installation risks.
vii) That **negative impacts on the environment and on people's environmental rights** be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied	The project will be implemented in such a manner that any potential social negative impacts will minimised and prevented wherever possible. Any Interested and Affected Parties (IAPs) are given the opportunity to learn about the project, raise questions, and provide input into the project at the planning stage. Furthermore, by generating green electricity the PoA has a positive impact on the environment by reducing the need for the use of non renewable energy sources. The preparation of each CPA will include local stakeholder consultation.
Other comments **Please provide any other comments on how this project contributes to sustainable development in South Africa (**optional) It is envisioned that the project will contribute significantly to the national capacity in the areas of Green Energy, Carbon Transactions and CDM Registration and Compliance. It is also expected that this project will streamline the development of other landfill gas emissions-reduction and sustainability projects, and benefit the environment by placing these projects firmly on other municipalities' agenda for the future. Similar projects can be duplicated and rolled out to the City's other landfill sites.	

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Environmental	Impact on local environmental quality	• Impact of the project on air quality	Locally, the project is expected to improve air quality through the reduction of carbon dioxide and methane from organic waste that would otherwise be landfilled. On a wider scale, the project is expected to contribute to addressing global climate change.
		• Impact of the project on water pollution	The project will not have an impact on any surface or ground waters. All condensate water from the gas collection pipe systems will be collected and treated in the on site leachate treatment plant or tankered off site for disposal. Runoff from hard standing infrastructure associated with the CHP compound or will be directed to storm water infrastructure. No hazardous runoff is anticipated from these surfaces; hence no impact on water pollution is expected from the project.
		• Impact of the project on the generation or disposal of solid waste	The operational project will generate insignificant amount of waste which will be disposed of through an appropriate disposal/treatment facility.
		• Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic)	All CHP engines will be enclosed in units that are acoustically designed for noise reduction, hence there expected to be no additional noise emission to current landfill site activities. The footprint and the vertical extension of the CHP compound /transformer is minimal and the location is carefully selected to reduce any additional visual impacts to the existing landfill site.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
	Change in usage of natural resources	• Impact of the project on community access to natural resources	All Projects will be installed within the boundaries of existing /newly developed landfill sites as a result they will not have a direct effect on community access to natural resources. The locations of these landfill sites were carefully chosen through an EIA process to reduce impact on community access to natural resources.
		• Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources	The project will have a positive impact on sustainable use of non renewable natural resources as it will generate "green energy" displacing the need for generating energy from non renewable sources like coal, natural gas, offering a real sustainable alternative.
		• Impact of the project on the efficiency of resource utilisation	The Project will utilise state of the art CHP technology with the currently available highest energy conversion efficiencies.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	The project will have no negative impacts on local or regional biodiversity, as all infrastructures will be situated on the landfill itself. Moreover the project may have a positive impact on local biodiversity. With the implementation of the project CH_4 emission having an effect on local air quality will be significantly reduced, improving air quality and enabling the re-population of any sensitive micro flora or fauna.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Economic	Economic impacts	• Impact of the project on foreign exchange requirements	The Project will not have an impact on foreign exchange requirements.
		• Impact of the project on existing economic activity in the area	The Project will result in the creation of skilled professional-level jobs, technician-level jobs and semi-skilled/unskilled jobs.
		• Impact of the project on the cost of energy	The Project will not have an impact on the cost of electricity to consumers, however when biogas is transported off-site to 3rd party industry as a fuel replacement it is likely to have a positive effect on the energy cost by replacing expensive fossil fuel use to cheaper biofuel use. Also, where electricity is generated and used locally there will be a saving of electricity consumed from the national grid.
		• Impact of the project on foreign direct investment	The Project will result in the injection of a significant amount of foreign exchange into the South African economy through the purchase of carbon credits (CERs).

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
	Appropriate technology transfer	• Positive or negative implications for the transfer of technology to South Africa arising from the project	The Project will utilize reciprocating engines or alternative equipment to combust landfill gas to generate power. The project will entail significant skills transfer in terms of the utilisation of this technology at a municipal level.
		• Impacts of the project on local skills development	The project will require the development of specific CHP engine (operation and maintenance) and landfill gas collection infrastructure management and maintenance skills. Furthermore the project will require the development of CDM management and administration skills.
		• Demonstration and replication potential of the project	This is one of the first municipal projects of its kind in South Africa, and it is felt that lessons learnt and systems developed during its implementation will be replicable in other municipalities throughout the country.

Indicators in Support of the Project Approval Criteria		
Category	**Indicator**	**Comment**

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Social	Alignment with national provincial and local development priorities	• How the project is aligned with provincial and national government objectives	The project is in line with provincial and national objectives for, waste management, and climate change action. It is aligned with the National Waste Management Strategy, the NEMA Waste Act 59 of 2008, Environmental Management and Climate Change Policies,
		• How the project is aligned with local developmental objectives	The project is align with the City of Cape Town Municipality's Integrated Development Plan on the following key elements: • Job creation • Emissions Reductions
		• Impact of the project on the provision of, or access to, basic services to the area	The project will not have a negatively impact on the provision of, or access to, basic services to the area.
		• Impact of the project on the relocation of communities if applicable	The projects will generate local jobs and income for the City of Cape Town. It will support the relocation of the disadvantaged community at Vissershok.
		• Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets)	The Project is in line with the City of Cape Town's Energy strategy which requires the promotion of green energy production and emission reductions within the Municipality. Moreover, the project contributes towards the City's energy targets in terms of the City's Energy and Climate Change Strategy.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
	Social equity and poverty alleviation	• Impact of the project on employment levels? (specify the number of jobs created/lost; the duration of time employed, distribution of employment opportunities, types of employment, categories of employment changes in terms of skill levels and gender and racial equity)	There will be significant labour opportunities in construction works at each site which will last 8 to 12 months. The following long term (10 to 20 years) employment opportunities are provisionally anticipated from the project for a CPA. There will be some economy of scale (sharing of employees) between sites depending on the number and locations of the CPAs: **General** Gas Project manager on site x 1 **Gas collection infrastructure (pipelines)** Well monitoring and pipe maintenance and supervisors x 2 **CHP compound and Electrical Generator:** Gas Monitoring and Cleaning x 1 Engine Technician & Engineering Technician x 2 General Workers x 2 Plant Supervisor x 1 Additional jobs will also be created for the ongoing environmental monitoring of the CDM processes • Carbon transaction administrator • Project manager
		• Impact of the project on community social structures	The project is not expected to impact on community or social structures other than through the creation of local job opportunities
		• Impact of the project on social heritage	The project will not impact on social heritage
		• Impact of the project on the provision of social amenities to the community in which the project is situated	The project will create local employment which will have a positive impact on local community. It will also significantly reduce local air pollution and eliminate potential odour issues hence improving the overall quality of local atmosphere.
		• Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes	The project will not impact on development areas.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
General	General Project Acceptability	• Is the distribution of project benefits deemed to be reasonable and fair?	The benefits of the project are reasonable and fair. No one group is experiencing negative impacts or uneven benefits over another. The benefits of the project i.e. air quality improvement, or electricity distribution into the national grid equally benefits all residents of the City of Cape Town municipality and residents in close proximity to the sites. Moreover, on a wider scale, the climate protection, and reduction of greenhouse gas benefit the whole nation and mankind.

Part D: Finance

Project Costs	
Development Costs (R's)	There are project development costs for the UNFCCC Registration of the PoA and first CPA (ZAR 1M), and for design and procurement of the first CPA (ZAR 2.5m)
Installed Costs (R's)	Installation cost of one CPA is estimated to be ZAR 28M. In total there are 3 CPA's envisioned which gives a total PoA installation cost of ~ZAR 83M
Other Costs (R's)	After installation, further expansion of gas collection infrastructure is expected (as landfills expands) and periodic lifecycle replacement costs are expected over the lifespan of the project. These cost are estimated to be ZAR 75M per CPA over 21 years. In total there are 3 CPA's envisioned which gives a total PoA "other" cost of ~ZAR 225M
Total Project Costs (R's)	The total project costs are expected to exceed ZAR 311.5M over the 28 years of the PoA
Sources of Finance	
Equity	The City of Cape Town may procure a public-private partnership (PPP) and equity will be provided by the private sector through this contract. Alternatively the City will fund the project.
Debt (long term)	*Name of organization(s) and amount (R's) for each:* Currently not known until the PPP process completed
Debt (short term)	N*ame of organization(s) and amount (R's) for each:* Currently not known until the PPP process completed
Amount not identified (R's)	*Amount (R's) and a brief summary of the needs and any outstanding issues* *(1 paragraph or less)* Currently not identified until the PPP contract is procured
Total CDM Contribution sought	The total amount of CER sale over 21 years of one CPA project life time is expected to be around ZAR 60,800,000 at a constants CER selling price of 3.87 USD. In total there are 3 CPA's envisioned which gives a total PoA CDM contribution of ~ZAR 182,400,000
Expected Price of CER in case of a contract to purchase for:	The purchase price of CER is assumed to be constant throughout the life of the project:

A period of 7 years A period of 10 years A period of 14 years (2x7 years)	Price of CER USD 3.87 = R 29.025 @ exchange rate of 7.5 ZAR/USD Price of CER USD 3.87 = R 29.025 @ exchange rate of 7.5 ZAR/USD Price of CER USD 3.87 = R 29.025 @ exchange rate of 7.5 ZAR/USD
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	For IRR calculation CER price was assumed to be USD 3.87 = R 29.025 (@ exchange rate of 7.5 ZAR/USD). This resulted and IRR of -0.1% and an NPV of ZAR 11,392,227 without the CDM income/CPA. With CDM revenue, IRR resulted in 10.4% and NPV ZAR 19,866,833 per CPA.
Constraints on tradability of carbon credits	Constraints on the tradability of carbon credits (CERs) are uncertain. The EU-ETS (European Union - Emission Trading Scheme) is only to purchase CERs from least developed countries (LDC) from 2013 onwards. South Africa is not a LDC and therefore will not qualify for sale for CERs to the EU-ETS.
Preliminary discussions with potential purchasers	As yet no probable buyers of the potential CER's have been approached. However discussions have been ongoing with such organisations as the World Bank's PCF and Trading Emissions Plc (TEP).

Draft PDD for LFG PoA signed on the understanding that corrections will be made as appropriate and final draft to be submitted for final scrutiny to City of Cape Town's project manager.

B. COETZEE
19 April 2012