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	Makhado Coal Mine Methane Gas Flaring Project
Date of Submission of PDD	20 July 2012

Project Developer	
Name	Tshipise Energy (PTY) Ltd
Organizational Category	Subsidiary of Coal of Africa Limited a Public Company Listed on JSE, AIM, ASX
Legal Status	*Proprietary limited company*
Street Address	2nd Floor the Gabba Blg the Campus 57 Sloane St Bryanston 2021 South Africa
Postal Address (if different from above)	Private Bag X6 Gallo Manor Johannesburg 2052

Website Address	www.coalofafrica.com
Main Activities	*(Not more than 1 paragraph)* *Coal miner and exploration company*
Summary of Financial Performance in last fiscal year	Parents 30th June 2011 in USD Revenue $261m Gross Profit $37.9m Non cash impairment charges $176.9m Net loss after tax $219.0m
Contact Person(s)	John Sparrow
Telephone	Work: +27115757472 Mobile: +27828209834
Fax	+27115767472
Email Address	john.sparrow@coalofafrica.co.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	Environmental Intermediaries & Trading Group Limited
Nature of partner	*Contractual (CME under POA)*
Organizational Category	*Private Company*
Legal Status (if private company)	*limited company*
Street Address	Unit 10,114 St Georges Bay Rd Parnell Auckland New Zealand
Postal Address (if different to Street Address)	Box 9185 Newmarket New Zealand 1149
Website Address	www.eitg.co.nz
Main Activities	*Emissions trading projects and GHG mitigation*
Contact Person(s)	Name Richard Hayes
Telephone	Office:+64 9 9201092 Cell:+64 21310 301
Fax	+64 9 9201093
Email Address	richard.hayes@eitg.co.nz

Contractual Arrangements	
Contractual arrangements between various entities involved	*EITG is the CME of a POA* "Capture and Combustion of Methane in Coal Mines" *that covers Coal Mine Methane Projects in Africa. Coal of Africa is working in conjunction with EITG to develop the CPA's and associated materials to achieve registration of the project under the CDM and to create the CERs. Both the POA and CPA1 are included with this application.*

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

Technical Summary of the project	
Objective of the Project	*Capture of fugitive methane emissions from mining activities and the burning of the methane by flaring. This is the first CPA of a series. Whilst the methane is flared the primary objective of the CPA is to prove the gas resource, its quality and volume to justify further development.* *Once the methane volume and flows prove sufficient to justify investment a second CPA will be registered and the methane gas diverted for the purposes of generating electricity for the mine and once the capacity exceeds 15mw electricity will be sent to the grid including local villages.* *Further methane will then be used in subsequent CPA for motive power and when sufficient piped off site to other locations such as local municipalities*

Project Description

Present a brief description of the project (approximately ½ page A4)
Identify the main processes and activities involved in the project. A flow diagram showing the processes/materials and/or products involved may be used to complement the description (over and above the ½ page A4).

The proposed project will utilise mine methane in the exploration concession area of Coal of Africa (Pty) Ltd, to be captured and flared. Once there is sufficient flow from a set of bore holes then the gas will be piped to a local power plant for electricity generation. The will form the basis of CPA2 under the POA.

A planned 15 Mw of capacity will be supported and pending completion of assessment of gas reserves and flows, further drilling activities, further capacity will be created.

The purpose of the project activity is to mitigate greenhouse gas emissions through:

a. Utilization of mine methane that would of otherwise be released into the atmosphere as a result of mining activities
b. The medium term expectations are the eventual substitution of a significant amount of

Technical Summary of the project

coal fired electricity currently being generated in the region with a cleaner fuel.

It is the view of the project proponents that the project activity will contribute to sustainable development goals through providing a low C02 emitting energy source for the area where currently power generation is dominated by coal fired sources from the state supplier Eskom. In addition to the greenhouse gas benefits, the Project Activity will have the following sustainable development benefits.

- Promotion of comprehensive resource utilization and rational energy use practices through utilization of a valuable energy source, which is currently vented to the atmosphere
- Improve local employment by around 8 persons per MW installed
- Reducing air pollution by reducing SOx and NOx in comparison to coal fired units currently used
- Help mitigate climate change which is having a detrimental effect on South Africa due to drought and extremes of climate.
- Help improve energy security in an environment where energy supplies can be erratic and unreliable
- Introduces new technologies into the South African environment as this project is 'first of its kind' in the South African Coal Mining Industry
- Ensure safer conditions for the population and workers by removing the threat of explosions from methane emissions

The project makes positive contributions to sustainable development. In terms of the sustainable development criteria published by the South African Designated National Authority, the sustainable development contribution is summarised under the following headings:

• **Social:** The project will contribute significantly to social development in terms of the social and labour plan. The plan calls for the education and development of skills in the region with intensive technical and resource training as well as operator skills training for the project.

• **Environmental:** On a global scale the project makes a contribution to greenhouse gas emission reduction. The project will also have a positive environmental impact at a regional as well as a local level. These impacts relate to a reduction of the impact of the generation of coal-based electricity, which includes coal mining impacts, utilisation of scarce water resources, SO_2 emissions and the impact associated with the disposal of coal ash.

The project will have a positive environmental impact at a local level. The local impact relates to a reduction in the impact of coal burning in steam boilers that would otherwise be established as part of the mining infrastructure. This includes coal mining impacts, SO_2 emissions and the impact associated with the disposal of coal ash.

• **Economic:** The project will contribute to the earnings of the Coal of Africa business. It will also have the highly beneficial impact of decreasing the volatility of the normal earnings profile from normal cyclical changes associated with the South African currency.

The project participants have negotiated with the suppliers of the gas engine electricity generators

Technical Summary of the project	
to transfer technology with respect to the maintenance of the machines to a local engineering firm. This will assist in local economic development. The project will contribute to foreign reserve earnings for South Arica.	
Project Constraints Are there any constraints affecting project operations or commissioning? *(Brief description: 1 paragraph or less) Note: these may be due to energy supply, infrastructure, other resources etc.* The current appreciation of the USD and the financial crisis are increasing capital costs and the cost of capital for this type of project	
Technology to be employed	*Describe in less than 5 lines.* The technology involves, well compressors, gas scrubbers and dehydrators, flaring units and gas power generating equipment. The technology is widely used internationally, but not yet common practice in South Africa. The project operators have utlised the technology elsewhere and full service support and technical training will be provided by the suppliers. New exploration technology will be used to map and understand the disposition of the methane gas and underground aquifers. Using this new technology will provide information never before able to be used to plan wells and to manage underground aquifers to avoid contamination of ground water. Proposed Development – Total Capex $5m USD
Greenhouse Gases Targeted	*Identify which greenhouse gas(es) this project will target.* *CH4 and CO2*
Emission reductions	*Indicate the expected emission reductions that will occur due to the project.* *On average 180,000 tonnes per annum approximately. This is an estimate and may increase depending on the gas discovered during the drilling program*
Baseline & Additionality Assessment	*Provide an indication of the baseline and additionality approach to be used, with a brief explanation of why the project is additional as defined under the Kyoto Protocol.* Using the approved methodology ACM0008 and applying the combined tool to establish a baseline and demonstrate additionality.

Technical Summary of the project	
	1. Barrier analysis shows that such projects are not common practice in South Africa, in fact only one CDM project is registered for destroying mine methane, the Beatrix Mine Methane project. 2. Financial analysis will show that without CER income the project will not meet the hurdle rate required in the industry sector[1] 3. There is no regulatory requirement to undertake this project
Monitoring	*Describe the parameters that will be used as performance indicators that will be monitored to verify that emissions reductions are taking place.* 1. *Gas flows measured including temperature pressure and gas composition* 2. *Electricity generated in KWh* 3. *Emissions factors for the South African electricity network* 4. *Non methane hydrocarbon component of the gas flows* 5. *Emissions from the use of other fossil fuels from within the project such as LPG for the auto ignition units in the flaring equipment*
Type of project/activities	*Identify which type of activity is involved in this project – and for each, provide brief details*
a. Energy Supply	*Improving energy efficiency by replacing existing equipment/minimization of transport and distribution/ fuel switch/ other* Use of fugitive methane for electricity generation. This would use the Approved Methodology ACM0008 v7.0 and comply with the processes therein.
b. Energy Demand	*Replacement of coal fired generation*
c. Industrial Process	*Not applicable*
d. Transport	*Future potential replacement of fossil fuel with CNG*
e. Waste Management	*Reduces ash waste and water pollution from avoiding the use of coal fired electricity generation*
f. Forestry/ land use	*Not applicable*
g. Other	*Not applicable*
Project Boundary Define the Project Boundary (Approximately 1 paragraph)	

[1] According to the Guidelines on the Assessment of Investment Analysis EB62 Report Annex 5 version 5.0 15/7/2011 the threshold IRR after taxes in South Africa is 11.9% for Group 2 subclass 8 mining/mineral production

Technical Summary of the project	
Note: a project boundary refers to all emissions which are under the control or directly affected by the project activity. Such a boundary can encompass equipment, processes and process flows. **The project boundary encompasses the geographical site, wells and pipeline systems to the point of use of the methane and the energy grid.**	
Indicate Emissions outside the Project Boundary	*Note: Significant and measurable net emissions of GHG that are attributable to the project outside of the project boundary* The emissions outside the project boundary would be due to the manufacture of the equipment used within the project. Such manufacture takes place in countries subject to emissions caps under the Kyoto Protocol. Some small one off emissions would occur due to transport of the equipment to South Africa and to the installation site. These are not covered by the Kyoto Protocol and not required to be included in the Approved Methodology ACM0008

Location of the Project	
Province	Limpopo
Municipality	Vhembe
Nearest city/large town	Louis Trichardt
Brief description of the location of the project site	The plant will be built at Makhado Coal Mine, at latitude 22°44'46" S and longitude 30°00'28" E.

Project Schedule/Timetable	
Earliest Project Start Date	*2013*
When is the expected first year of CER delivery	*2014*
Project Lifetime	7 years renewable for 2x7 years
Project End Date	*2034*
Crediting Period	3 times 7 years, with reassessment of baseline for each 7 year renewal?

Project Schedule/Timetable	
Current Status or phase of the project	The necessary financial and other feasibility studies are complete, an exploration program to locate underground gas has commenced and well drilling with start and pre draining of mine methane will commence in 2013.
DNA Approval	*Has this project been submitted to the DNA for approval previously?* *No, A PIN was lodged dated 23rd March 2012 and a letter of non objection dated 20/04/2012 was received.*
Approval by other bodies	The project has the support of PASA. A full EIA process is complete. Extensive stakeholder consultation has been completed and the project adjusted to meet stakeholder concerns.

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 project will contribute to the earnings of the Coal of Africa business. It will also have the highly beneficial impact of decreasing the volatility of the normal earnings profile from normal cyclical changes associated with the South African currency.

The process of assessing and proving the methane resource whilst reducing GHG flaring the methane will ultimately lead to the use methane to substitute for fossil fuels used either in electricity generation or motive power.

The project participants have negotiated with the suppliers of the gas engine electricity generators to

transfer technology with respect to the maintenance of the machines to a local engineering firm. This will assist in local economic development. The project will contribute to foreign reserve earnings for South Arica.

The project will also improve energy security for the mines operating in the area.

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

Please give details (1 paragraph)

The project will contribute significantly to social development in terms of the social and labour plan. The plan calls for the education and development of skills in the region with intensive technical and resource training as well as operator skills training for the project.

Potential downstream smme's from the project activities. Downstream compressing of methane for use in municipalities particularly in public transport.

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	*(1 paragraph)* *Coal of Africa has initiated an extensive biodiversity offset strategy lead by Transboundary Consulting Africa, Professor Whilhem van Reit*
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	*(1 paragraph)* *A full EIA has been undertaken as part of the Makhado site development and the mitigation strategies in the plan will be adopted by the project developers. PASA approved an EMPR dated 14 September 2009 that sets out all the environmental issues and stakeholder consultation process*
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	*(1 paragraph*) *No major landscaping is expected, and pipes if laid will be underground. The sites affected are not sites linked to the nation's cultural heritage. All site works planned are to be remediated as per the EIA plan*
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	*(1 paragraph)* These impacts relate to a reduction of the impact of the generation of coal-based electricity, which includes coal mining impacts, utilisation of scarce water resources, SO2 emissions and the impact associated with the disposal of coal ash.
v) That **the use and exploitation of non-renewable resources is responsible and equitable**, and takes into account the	*(1 paragraph)* The emissions project and use are miniscule in comparison to the emissions reductions achieved. Steel where used will have the maximum safe recycled components per the relevant standards.

consequences of the depletion of the resource	
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.	*(1 paragraph)* On a global scale the project makes a contribution to greenhouse gas emission reduction
vii) That **a risk averse and cautious approach** is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions	*(1 paragraph)* While the project is innovative in South Africa extensive experience in Australia, the USA and China has been incorporated into the planning and design of the project
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	*(1 paragraph)* The project EIA covers potential impacts by providing remediation where required. Extensive stakeholder consultation at all levels has dealt with issues both locally and regionally and at levels of national policy

Other comments

Please provide any other comments on how this project contributes to sustainable development in South Africa (optional) It is the view of the project proponents that the project activity will ultimately contribute to sustainable development goals through providing a low C02 emitting energy source for the area where currently power generation is dominated by coal fired sources from the state supplier Eskom. In addition to the greenhouse gas benefits, the Project Activity will have the following sustainable development benefits.

- Promotion of comprehensive resource utilization and rational energy use practices through utilization of a valuable energy source, which is currently vented to the atmosphere
- Improve local employment by around 8 persons per MW installed
- Reducing air pollution by reducing SOx and NOx in comparison to coal fired units currently used
- Help mitigate climate change which is having a detrimental effect on South Africa due to drought and extremes of climate.
- Help improve energy security in an environment where energy supplies can be erratic and unreliable
- Introduces new technologies into the South African environment
- Ensure safer conditions for the population and workers by removing the threat of explosions from methane emissions

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Environmental	Impact on local environmental quality	• Impact of the project on air quality • Impact of the project on water pollution • Impact of the project on the generation or disposal of solid waste • Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic)	Please comment on the impact of the project on local environmental quality. Comment specifically on the indicators of relevance which are given here. (1 paragraph) Reduction of the use of coal for electricity generation will enhance air quality. Reductions and S02 and NOx will also occur from switching to methane. Reduced ash and water use (from plant cooling requirements) will result in reduced waste and water pollution Positive reductions in the amount of GHG into the atmosphere will be achieved Due to the high salinity of the water drained from the mining structures the potential exists to investigate desalination to improve water quality and availability in the area.

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 • Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources • Impact of the project on the efficiency of resource utilisation	Please comment on the impact of the project on the usage of natural resources. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project will not affect community access to natural resources The project will positively impact the use of natural resources via the substitution of coal fired generation with methane, thereby reducing water use and coal resources. The project will utilise the resource, namely methane, effectively in comparison to the past practice of it venting into the atmosphere with the GHG impact and the potential fire risks, both of which are removed by the project activity. Combusting the methane will utilise otherwise wasted energy potential to generate much needed electricity.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	Please comment on the impact of the project on biodiversity and ecosystems. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The environmental impact assessment indicates little to no impact on biodiversity and ecosystems. It is likely that the project will remove or reduce existing risks.

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
Economic	Economic impacts	• Impact of the project on foreign exchange requirements • Impact of the project on existing economic activity in the area • Impact of the project on the cost of energy • Impact of the project on foreign direct investment	Please comment on the economic impacts of the project. Comment specifically on the indicators of relevance which are given here. (1 paragraph) Significant foreign exchange earnings are probable from the project operation. Some initial payment in USD will be required to establish the technology in the initial stages. However this is one off and likely to stimulate local expertise and the engineering industry. Economic activity in the area is likely to be safeguarded by the project providing a reliable electricity supply in times of potentially erratic supply The project will increase costs of energy however that energy will be 'clean' energy and have consistent supply. The cost increases are a one off and long term the price of energy will be less likely to increase. The project is likely to foster further foreign investment. The project itself will be funded from foreign investors.

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 • Impacts of the project on local skills development • Demonstration and replication potential of the project	Please comment on the impacts of the project on appropriate technology transfer. Comment specifically on the indicators of relevance which are given here. (1 paragraph) The project will introduce new technology and systems to the South African environment. The supplier has noted it has yet to provide such technology in Africa whilst the same technology is being introduced in China, USA, Australia and Thailand. Local skills in installing, operating and maintaining the newly introduced technology will be significant. It is expected training and education will result in a pool of skilled labour to maintain and operate the project components. Once installed and proven the technology will be attractive to other mining operations where there are fugitive methane emissions. This has proved true in China where such projects are becoming relatively prolific.

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 • How the project is aligned with local developmental objectives • Impact of the project on the provision of, or access to, basic services to the area • Impact of the project on the relocation of communities if applicable • Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets)	- Please comment on how the project is aligned with national, provincial and local development priorities. Comment specifically the indicators of relevance to the project which are given here. (1 paragraph) - Enhancement of power generating capacity - Enhancement of local mine operations and safety - Potential to increase employment opportunities due to enhanced mine operations and safety - Proposed development has no adverse impact on local community - Proposed development has positive impact on environment and local community due to its capacity to offset the burning of coal fired power generation

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) • Impact of the project on community social structures • Impact of the project on social heritage • Impact of the project on the provision of social amenities to the community in which the project is situated • Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes	Please comment on the impact of the project on social equity and poverty alleviation. Comment specifically on the indicators of relevance which are given here. (1 paragraph) - Employment of 2 local people per well site resulting in a full time employment of up to 16 in total in a phased project development spanning 12 months, subject to internal and external approvals, project economics and support from local community and state regulatory authorities. These employees will be trained in production monitoring, product load out operations, Occupational Health and Safety,general equipment maintenance and security. - It is expected that with the training to be given to these new employees, their newly acquired skill sets will enable them to be fully transportable (to be mutually agreed) within our company's operations in South Africa. - The company is an equal opportunity employer - The mine is surrounded by the poorest communities in the region. The availability of energy and clean water supplies will provide the foundation for the communities to improve health education and other services which fits in with the Provincial Governments policy of uplifting the basic services to impoverished local communities

Indicators in Support of the Project Approval Criteria			
Category		**Indicator**	**Comment**
General	General Project Acceptability	• Are the distribution of project benefits deemed to be reasonable and fair?	Please comment on whether the benefits occurring from the project due to the contribution of the CDM are reasonable and fair. (1 paragraph) The project equitably distributes the benefits to the participants and the community as a whole via its compliance with local policies and laws as well as the spin off benefits in terms of employment education and skills development. The parties undertaking the risk are rewarded at their normal investment hurdle rate for the risk assumed by them. There will be significant potential for the creation of smme to support the various project activities and to service the structures.

Part D: Finance

Project Costs	
Development Costs (R's)	R 10m
Installed Costs (R's)	R 35m
Other Costs (R's)	R 5m
Total Project Costs (R's)	R 50m
Sources of Finance	
Equity	*Name of Organisation(s) and amount (R's) contributed by each* Coal of Africa from existing equity and lines of credit.
Debt (long term)	*Name of organization(s) and amount (R's) for each* *Deutsche Bank Facilities $40m USD*
Debt (short term)	N*ame of organization(s) and amount (R's) for each* N/A
Amount not identified (R's)	*Amount (R's) and a brief summary of the needs and any outstanding issues* *(1 paragraph or less)* N/A
Total CDM Contribution sought	*Amount (R's) and a brief summary of the needs and any outstanding issues* *(1 paragraph or less)* 200,000 x 85 = 17m pa
Expected Price of CER in case of a contract to purchase for: A period of 7 years A period of 10 years A period of 14 years (2x7 years)	We have been told that long term contracts are difficult to price as the baseline must be reassessed every 7 years. *Price? (R's)* 85 *Price? (R's)Not applicable as the project is 7 years renewable* *Price? (R's)*85
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	*Note: Please indicate assumed price of CER as used in your calculation* Without IRR negative% With CER @8.5 Euro 12%

Constraints on tradability of carbon credits	*Have any commercial arrangements been made that may impact the tradability of the carbon emission reductions? If yes, please define.Note. Examples would be subjection to a mortgage, government tax etc.* No
Preliminary discussions with potential purchasers	*Have you had any preliminary discussions with any potential purchasers of the carbon credits (CERs)* *If yes, please give brief details.* Discussion with European Trading Houses, Nobel and Vittol