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 use only)	
Date received (office use only)	

NOTES ON COMPLETING THIS PROJECT DESIGN DOCUMENT

1. Please provide this PDD in both hard-copy (one copy) and electronic formats (MSWord)
2. The information submitted to the DNA in this PIN will remain confidential.
3. Please ensure that all fields are filled in as far as possible to allow for proper consideration of the proposed project. Please indicate if information is not available for any particular item and reasons for the unavailability of information.

Part A: Project Proponent Details

Project Name	Use of waste gas at Namakwa Sands in South Africa
Date of Submission of PDD	15/12/2011

Project Developer	
Name	Exxaro Resources Limited
Organizational Category	Private Company
Legal Status	Limited Company
Street Address	Exxaro Corporate Centre Roger Dyason Road Pretoria West Gauteng

	0183
Postal Address (if different from above)	As above
Website Address	http://www.exxaro.com
Main Activities	Exxaro is a South African-based mining group and has a commodity profile in coal, mineral sands, base metals and industrial minerals. Exxaro is the second largest coal producer in South Africa, and the third-largest global producer of mineral sands.
Summary of Financial Performance in last fiscal year	Exxaro Resources Ltd financial position at 31 December 2011: Total assets: R 28,609 million Net operating profit: R 2,636 million Revenue: 17,155 million
Contact Person(s)	Mr Thomas Garner
Telephone	Work: 012 307 4034 Cell: 083 609 1309
Fax	012 307 4092
Email Address	thomas.garner@exxaro.com
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	There are no project partners. This section is intentionally left blank.
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	*EnBW entered into an agreement with Exxaro Resources Limited to purchase the generated CERs. The details of this contract are confidential.*

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

Technical Summary of the project	
Objective of the Project	The purpose of the project is to reduce greenhouse gas emissions by utilising waste gas from a smelter operation. The waste gas will be fed to gas engines for the generation of electricity.

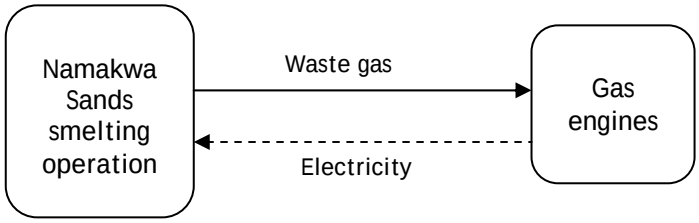
Project Description

The Exxaro-owned Namakwa Sands smelter is a heavy minerals mining and beneficiation business located in Saldanha Bay. The smelting operation consists of two closed, DC-arc furnaces and inside these furnaces, the reduction of mined ilmenite to produce titania (TiO_2) slag and iron (Fe) occurs.

The smelting activity results in hydrogen and carbon dioxide gas being formed, which is referred to as furnace off-gas. Currently, the majority of the furnace off-gas is cleaned and then flared which is a safety measure as carbon monoxide is extremely poisonous. Cleaning of the gas prior to flaring is required to reduce the particulate emissions from the flares. However, the flaring of the off-gas means that the energy inherent in the gas is not utilised.

The project will use this cleaned furnace off-gas, which was previously flared, to generate electricity using internal combustion engines. At the end of project commissioning, these engines will displace 13.6 MW of electricity, resulting in emission reductions of an average of 88,298 tCO_2e/ year. The electricity will be used by the Namakwa Sands smelting operation, thus resulting in a reduction of electricity purchased from Eskom.

A simplified schematic of the project activity is shown in the diagram below:



Project Constraints

There are no constraints affecting project operations or commissioning.

Technology to be employed	Internal combustion engines will be installed to generate electricity from the CO-rich furnace off gas. This technology is new to South Africa as there is no reference plant running on gas with comparable hydrogen and carbon monoxide content. Furthermore, Exxaro Resources Ltd has no previous experience operating this type of technology.
Greenhouse Gases Targeted	This project will target CO_2.
Emission reductions	Total emission reductions: 835,475 tCO_2e* Annual average emission reductions:83,547 tCO_2e/year *A ten year fixed crediting period has been selected for this project activity.

Technical Summary of the project	
Baseline & Additionality Assessment	Baseline: The baseline scenario is the purchase of electricity from Eskom. Additionality: The additionality of the project activity is demonstrated using an investment analysis, as per the 'Tool for the assessment and demonstration of additionality'. It is proved that the nominal after tax return of equity in the project activity is significantly less than the default benchmark approved by the Executive Board of the UNFCCC.
Monitoring	The following parameters will be monitored in the project activity: – The quantity of waste gas used for energy generation – The temperature of the waste gas – The quantity of electrical output from the engines – The quantity of electricity supplied to the Namakwa Sands smelting operation – The quantity of electricity consumed by the project activity
Type of project/activities	*Identify which type of activity is involved in this project – and for each, provide brief details*
a. Energy Supply	This project activity generates electricity in internal combustion engines from furnace off gas.
b. Energy Demand	N/A
c. Industrial Process	N/A
d. Transport	N/A
e. Waste Management	N/A
f. Forestry/ land use	N/A
g. Other	N/A
Project Boundary The project boundary encompasses: – The facility generating the furnace off-gas; – The proposed electricity generation plant, which will generate electricity from the furnace off-gas; – The facility using the electricity, which in this case is the same as the facility generating the furnace off-gas; and – The electricity grid, to the extent of determining the grid emission factor.	
Indicate Emissions outside the Project Boundary	There are no significant and measurable net emissions of GHGs that are attributable to the project outside of the project boundary.

Location of the Project	
Province	Western Cape
Municipality	Saldanha Bay

Nearest city/large town	Cape Town
Brief description of the location of the project site	The site is located within the Saldanha Bay Local Municipality, and is 15 km from the towns of Vredenburg and Saldanha. The GPS coordinates are: 32° 57' 43" S 18° 02' 39" E

Project Schedule/Timetable	
Earliest Project Start Date	July 2013
When is the expected first year of CER delivery	2013
Project Lifetime	A minimum of fifteen years
Project End Date	June 2023
Crediting Period	A fixed ten year crediting period has been selected for this project activity.
Current Status or phase of the project	The project activity is in the preparation stage. Exxaro Resources Ltd's Board conditionally approved the capital expenditure for the project at a board meeting on 22/08/2011. The approval is conditional upon receiving a positive validation report.
DNA Approval	This project has not been previously submitted to the DNA for approval.
Approval by other bodies	The project has received a Record of Decision (RoD) from Government regarding the project's basic assessment

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?

There will be a transfer of technology from a developed country to a developing country. The internal combustion engines that are used to generate the electricity will be sourced from GE Jenbacher in Austria (Annex-1 country) and will be imported to South Africa. Internal combustion engines are currently used in only five other South African registered CDM projects. These projects are all biogas projects, and differ fundamentally from the Namakwa Sands project. The main difference lies in the fact that the fuel gas of the proposed project does not contain any methane, but rather carbon monoxide and hydrogen. In addition, the projects mentioned above operate the engines on gas with a significantly higher calorific value than the furnace off-gas that this project will use. There will also be a transfer of knowledge as personnel responsible for the operation and maintenance of the engines will receive the necessary training.

2. Social: Does the project contribute to social development in South Africa? The project will create 11 jobs in the operations phase. The creation of jobs is important since the Namakwa Sands smelting operation is located in an area with very little established industries and, therefore, very few existing employment opportunities. The number of temporary jobs created in the construction phase has not been estimated, but similar projects estimate that the number of temporary jobs created is around 100 jobs. It is Exxaro Resources Ltd's policy to actively recruit labour from local communities wherever possible. The creation of jobs is in line with the Saldanha Bay Municipality's Integrated Development Plan (IDP) for 2006-2011, which states that growing unemployment is one of the greatest challenges facing the municipality.	
3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development?	
i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	*The current land use at the project site is heavy industrial and therefore there will be no disturbance of ecosystems or a loss of biological diversity as a result of the project activity.*
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	*Due to the nature of the project (re-routing the gas that is currently flared, through gas engines) there will be no significant change to the air quality.*
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	*There are no signs of culturally or historically significant elements (including archaeological or paleontological sites) on or close to the project site. The project activity did not need to apply for a permit in terms of the National Heritage Resources Act, 199 (Act 25 of 1999).*
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	*The project activity will not produce solid construction waste during the initiation phase of the project, nor will the project produce solid waste during its operational phase. The project will, however, produce liquid effluent (other than normal sewerage) during its operation which will be treated at the ROSE Foundation in the Western Cape.*
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	*This project activity does not make use of non-renewable resources. Furnace off gas that is currently flared at the ilmenite smelting operation is used to generate electricity in internal combustion engines. The project will displace grid electricity, thereby indirectly reducing the exploitation of non-renewable natural resources (coal) from coal-fired power stations, as well as helping to lessen the associated environmental impacts of coal mining.*
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.	*Furnace off gas is used for the production of electricity in gas engines. This process is responsible and equitable.*
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	*The basic assessment investigated alternative options. The alternative with the lowest impact was chosen – the installation of gas engines. This is a risk averse and cautious approach.*
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 overall environmental impact will be positive; since the project will reduce the volume of greenhouse gases emitted to the atmosphere and will also reduce the particulate emissions from the site. The project will also displace grid electricity, thereby indirectly reducing the exploitation of non-renewable natural resources (coal) from coal-fired power stations, as well as helping to lessen the associated environmental impacts of coal mining.*
Other comments **Please provide any other comments on how this project contributes to sustainable development in South Africa** On a global scale, the project makes a contribution to greenhouse gas emission reduction.	

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)	• The project's impact on air quality will be positive since the project will reduce the volume of greenhouse gases emitted to the atmosphere and will also reduce the particulate emissions from the site. • The project will not change the current local water availability or access. The project will also have an impact on the current local water quality. • The project activity (in implementation and operation) does not produce solid waste. • It is anticipated that the noise generated by the project activity will be negligible in comparison to that of the existing factory. The installation of the gas engines will adhere to all noise control regulations. The proposed project activity will have a positive local impact as it will lower the environmental impacts of coal based power generation. This includes the amount of sulphur dioxide released due to the combustion of low grade coal, particulate emissions, water demand of coal based power generation, and the environmental impact of ash disposal.
	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	• The project activity will not use any natural resources that are currently used by the community. The project activity involves the utilisation of furnace off gas that is already generated on site and flared. • The proposed project will not change the current local water availability or access. Neither will the project have an impact on the current local water quality. The project activity does not make use of minerals or any other non-renewable natural resources. • The project will use an alternative energy source to generate captive electricity. This will reduce the smelter's reliance on Eskom power. Though the project will not result in a direct reduction in greenhouse gas emissions, it will result in an indirect, 'upstream' reduction in carbon emissions, through a reduction in the on-site use of electricity, which is produced primarily by conventional coal-fired power stations. The project activity is considered to have a high level of resource utilisation.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	• The current land use at the project site is heavy industrial and therefore there will be no disturbance of ecosystems or a loss of biological diversity as a result of the project activity.

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	• The project will contribute to foreign reserve earnings for South Africa via the carbon credit sales revenue. • The project will generate additional temporary employment in the construction phase, and will result in permanent employment during the operational phase (11 jobs). • The project will increase the cost of energy for the Namakwa Sands smelting operation, as it is more expensive to generate captive electricity from furnace off gas, than to import it from the grid. However, the expected revenue from the certified emission reductions (CERs) will be used to overcome this barrier.
	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	• There will be a transfer of technology from a developed country to a developing country. The internal combustion engines that are used to generate the electricity will be sourced from GE Jenbacher in Austria (Annex-1 country) and will be imported to South Africa. • There will be a transfer of knowledge as the personnel responsible for the operation and maintenance of the engines will receive the necessary training. • The project can serve as an example to other smelting operations in South Africa on the importance of exploring alternative energy sources and the possible generation of CERs.

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)	• The project supports the emission mitigation actions of South Africa. According to a letter sent to the United Nations Framework Convention on Climate Change (UNFCCC) on 29/01/2010, South Africa committed to "taking nationally appropriate mitigation actions to enable a 34% deviation below the 'Business as Usual' emissions growth trajectory by 2020 and a 42% deviation below the 'Business as Usual' emissions growth trajectory by 2025". The project will reduce electricity consumption from a predominantly coal-fired grid, which will result in a reduction in all of the negative impacts associated with coal mining. • The project will create 11 permanent jobs. The creation of jobs is in line with the Saldanha Bay Municipality's Integrated Development Plan (IDP) for 2006-2011, which states that growing unemployment is one of the greatest challenges facing the municipality. • The project activity does not involve the relocation of any communities. • The South African Government's economic policy is defined in the New Growth Path. This document indicates that the key social development deliverable the policy is aiming to support is the creation of new jobs in South Africa. Unemployment is recognised as key problem in the country that needs to be addressed. This project will create jobs during the installation and operational phases of the programme, thereby supporting Government's policy objectives.

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	• The project will create 11 jobs in the operations phase. The creation of jobs is important since the Namakwa Sands smelting operation is located in an area with very little established industries and, therefore, very few existing employment opportunities. The number of temporary jobs created in the construction phase has not been estimated, but similar projects estimate that the number of temporary jobs created is around 100 jobs. It is Exxaro Resources Ltd's policy to actively recruit labour from local communities wherever possible. • The project will reduce the particulate emissions from industrial sources in the Saldanha area, thereby improving the working conditions for local employees.

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 project contributes to sustainable development from an economic, environmental and social perspective. The local community and environment benefits from the project activity and these benefits are considered to be reasonably and fairly distributed. • The financial benefit of the project is reasonably distributed as the carbon credits are sold to the mutual benefit of the contracting parties.

Part D: Finance

Project Costs	
Development Costs (R's)	Confidential
Installed Costs (R's)	Confidential
Other Costs (R's)	Confidential
Total Project Costs (R's)	Confidential
Sources of Finance	
Equity	*100%*
Debt (long term)	*N.A.*
Debt (short term)	N.A.
Amount not identified (R's)	*N.A.*
Total CDM Contribution sought	*Confidential*
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)	N.A.
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	*The nominal after-tax IRR values were calculated for the project with and without CER revenues:* *Project excl. CER revenues: -8.6%* *Project incl. CER revenues: Confidential*
Constraints on tradability of carbon credits	*There are no constraints related to tradability of Exxaro Namakwa Sands' carbon credits*
Preliminary discussions with potential purchasers	*Yes, a purchase agreement has been reached with EnBW.*