energy
Department:
Energy
REPUBLIC OF SOUTH AFRICA

Private Bag X 19 , Acardia ,Pretoria, 0007, Tel:012-444 4116, Fax: 012 341 5133
Private Bag X9111, Cape Town, 8000, Tel: 021-469 6412, Fax: 021-465 5980

Project Design Document (PDD)

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	Market Coke Waste Heat Recovery Project
Date of Submission of PDD	21/05/2012

Project Developer	
Name	Exxaro Resources Limited (Exxaro)
Organizational Category	Private Company
Legal Status	Limited company
Street Address	Roger Dyason Road Pretoria West, 0183 South Africa

Postal Address (if different from above)	PO Box 9229 Pretoria 0001 South Africa
Website Address	www.exxaro.com
Main Activities	Exxaro is a South African based mining group, listed on the Johannesburg Stock Exchange Limited (JSE Limited). Exxaro has a diverse commodity portfolio in coal, mineral sands, base metals and industrial minerals, with exposure to iron ore through a 20% interest in Sishen Iron Ore Company (SIOC). As the second-largest South African coal producer with capacity of 45 million tonnes per annum and the third-largest global producer of mineral sands, Exxaro is a significant participant in the coal and mineral sands markets both locally and internationally and has existing operational interests in South Africa, Namibia, Australia and China.
Summary of Financial Performance in last fiscal year	According to Exxaro's Integrated Annual Report for the year ended 31 December 2011, the Exxaro group continues to be financially sound, enabling progress towards realising the group's strategic growth initiatives. Key financial indicators include: • Revenue - R21,3 billion • Net operating profit – R4,03 billion • Net cash inflow - R2,5 billion • Net debt to equity ratio - 3%
Contact Person(s)	Ludwig Steinmann
Telephone	Work: +27 (0)12 307 4742 Cell: +27 (0)83 419 5949
Fax	+27 (0)12 307 3904
Email Address	ludwig.steinmann@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	Not applicable (N/a)
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	N/a

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

Technical Summary of the project	
Objective of the Project	Exxaro Resources Limited (Exxaro) plans to construct the Market Coke Plant (the project facility) at their Grootegeluk Coal Mine in the Limpopo Province of South Africa. The Market Coke Waste Heat Recovery Plant (the project activity) will utilise waste heat recovered from the coking pyrolysis process in the project facility to produce electricity. The project activity is expected to have a gross installed capacity of 60MW and the objective of the project activity is to supply the electricity produced, 462 000MWh/yr, to the internal grid of the Grootegeluk Coal Mine thereby displacing more carbon intensive electricity from the South African national grid operated by Eskom (the baseline) and therefore also lessening the burden on the national grid.

Project Description

The Market Coke Waste Heat Recovery Plant (the project activity) will utilise waste heat recovered from the coke oven flue gas (waste gas, off-gas) after tertiary combustion, produced as part of the coking pyrolysis process in the Market Coke Plant (the project facility) to produce electricity.

The project activity is expected to have a gross installed capacity of 60MW and the objective of the project activity is to supply the electricity produced, 462 000MWh/yr, to the internal grid of the Grootegeluk Coal Mine thereby displacing more carbon intensive electricity from the South African national grid operated by Eskom (the baseline) and therefore also lessening the burden on the national grid. Additionally, the project activity is expected to result in greenhouse gas (GHG) emissions reductions of approximately 450 912tCO2e/yr. The baseline or business as usual practice would be to combust the gases in flue gas ducts and vent the waste heat to atmosphere.

A simplified process flow diagram for the Market Coke Waste Heat Recovery Plant is provided in the figure below:

Technical Summary of the project

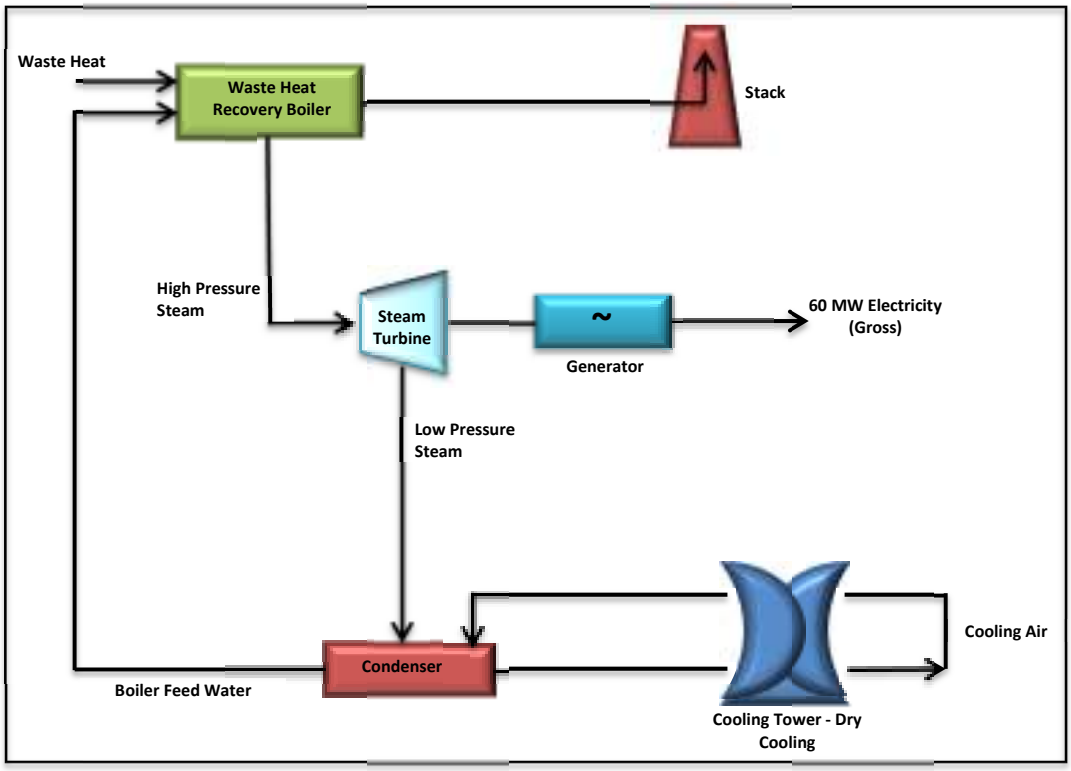

Figure 1: Simplified process flow diagram for the Market Coke Waste Heat Recovery Plant

As can be seen from the above, waste heat from the coke oven flue gas after tertiary combustion from the project facility, enters the project activity at the WHRB where it is used to raise steam for use in the steam turbine. The steam is expanded through the turbine driving a shaft connected to the generator to produce electricity. The project activity's expected plant load factor is 96%.

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.*

Other than the need for carbon revenues to implement the project activity, there are no other constraints potentially affecting project operations or commissioning. Moreover, the project activity and project facility will be located on the existing Grootegeluk Coal Mine and as such, existing infrastructure will be augmented to accommodate these plants.

Technology to be employed	*Is the technology one that has been previously tried and tested in South Africa or internationally? If yes, provide details (1 paragraph)* The Market Coke Waste Heat Recovery Plant will use standard technology and equipment to recover the waste heat, in the form the gas system, waste heat recovery boilers, a standard steam system with turbines, generators, switchgear and control systems. This is mature technology and the equipment is available from a large number of manufacturers and is to a large extent interchangeable. The only deviation from the standard is that the project activity will utilize dry (air) cooling technology as opposed to a conventional wet cooling technology and systems, as a result

Technical Summary of the project	
	of the general water shortage in the region thereby enhancing its sustainable development and environmental benefits (even though the wet cooling technology and system would be cheaper and would also allow the generation of more power). *Have the project operators had any previous experience or expertise with operating the technology?* Exxaro is traditionally a mining company that has not ventured or built any power plants. However, participating in the energy sector is an established part of Exxaro's business strategy and Exxaro is undertaking numerous energy projects to secure electricity for its operations, lower its carbon footprint and mitigate against the impending carbon taxes that could be levied. The Namakwa Sands Cogeneration Project is similar to the Market Coke Waste Heat Recovery Project and is at an advanced stage of development, having completed full feasibility studies and nearing start of construction.
Greenhouse Gases Targeted	*Identify which greenhouse gas(es) this project will target.* The Market Coke Waste Heat Recovery Plant will result in the displacement of greenhouse gas (GHG) intensive electricity supplied from the South African national grid and will therefore target Carbon Dioxide (CO_2) reductions.
Emission reductions	*Indicate the expected emission reductions that will occur due to the project.* The project activity is expected to result in GHG emissions reductions of approximately 450 912tCO_2e/yr and have a total estimated emissions reductions of approximately 4 509 120tCO_2e.
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.* The baseline is the continuation of the status quo whereby the Grootegeluk Coal Mine's electricity is supplied from the South African national grid. The usual practice for the project facility would be to vent the waste heat generated from the coke ovens. Additionality is assessed and demonstrated using investment analysis. The project activity is additional since without CDM revenues from the sale of certified emissions reductions (CERs) the project activity will not overcome Exxaro's internal benchmark for project investment.
Monitoring	*Describe the parameters that will be used as performance indicators that will be monitored to verify that emissions reductions are taking place.* The monitoring plan will ensure that emission reductions are accurately monitored, recorded, and reported. Exxaro has a clear and well defined management and organisational structure which ensures monitoring roles and responsibilities are clearly defined. The main variables monitored include: • Electricity generation – the quantity of electricity supplied

Technical Summary of the project	
	to the recipient facility by the project activity, which in the absence of the project activity would have sourced from the Eskom grid. This will be monitored in MWh • Abnormal operations – this includes abnormal operation of the project facility including emergencies and shut down. This will be monitored in hours. Electricity meters will measure the quantity of electricity supplied to the recipient facility. The meters are likely to be 4-quadrant billable class meters that are bi-directional – this means that they subtract any electricity used by the project activity during start up, or when the project activity is not producing electricity. Electricity meters will be installed on the feeds to the recipient facility. The electricity meters will be fitted with a telemetry system, and the data will be fed into the plant SCADA system on a daily basis. The main and check meters will be reconciled monthly to check if their readings are within a pre-defined accuracy band. If there are discrepancies, a notification will be sent to the control room to advise the operator to attend to the problem. On a monthly basis, the project activity plant manager (or other designated employee) and a representative from Grootegeluk Coal Mine will read electricity meters to determine the quantity of electricity produced by the project activity. The electricity readings will be logged electronically for the purposes of calculating emission reductions. The information will be saved onto the Exxaro's SCADA system, as well as Exxaro's on-site financial systems. Backups will be kept both on- and off-site, and all of the data will be available for CDM verification. As per ACM0012, all data collected as part of the monitoring plan will be archived electronically, and will be kept for a minimum of two years at the end of the crediting period.
Type of project/activities	*Identify which type of activity is involved in this project - and for each, provide brief details*
a. Energy Supply	*Select if applicable: Renewable Energy (excluding biomass)/ Biomass/ Cogeneration/ Improving energy efficiency by replacing existing equipment/minimization of transport and distribution/ fuel switch/ other* Cogeneration – the project activity is the construction and operation of a Market Coke Waste Heat Recovery Plant to utilize waste heat produced by the associated Market Coke Plant to produce electricity.
b. Energy Demand	*Select if applicable: Replacement of existing 'household equipment'/ improvement of energy efficiency of existing production equipment/ other* N/a
c. Industrial Process	Cogeneration – the project activity is the construction and operation of a Market Coke Waste Heat Recovery Plant to utilize waste heat produced by the associated Market Coke Plant to produce electricity.
d. Transport	*Select if applicable: More efficient engines for transport/ modal*

Technical Summary of the project	
	shift/ fuel switch/ other N/a
e. Waste Management	*Select if applicable: Capture of landfill methane emissions/ utilization of waste and waste water emissions/ other* N/a
f. Forestry/ land use	N/a
g. Other	N/a
Project Boundary Define the Project Boundary (Approximately 1 paragraph) The project boundary includes the proposed project facility, containing the coke ovens where the coke oven flue gas is generated and the associated and co-located project activity containing the gas system, waste heat recovery boilers, steam system with turbines, generators, switchgear, control systems and ancillary equipment. The South African national electricity grid operated by Eskom which supplies the electricity to the Grootegeluk Coal Mine, shall also form part of the project boundary for the purposes of determining the baseline and grid emissions factor (GEF).	
Indicate Emissions outside the Project Boundary	Emissions attributable to the project activity, but which fall outside of the project boundary, include the ongoing mining operations at the Grootegeluk Coal Mine.

Location of the Project	
Province	Limpopo Province.
Municipality	Lephalale Local Municipality, which falls within the Waterberg District Municipality.
Nearest city/large town	Lephalale (formerly Ellisras).
Brief description of the location of the project site	The Market Coke Cogeneration Plant will be located at the Grootegeluk Coal Mine on the farm Daarby 458 LQ, approximately 25km west of the town of Lephalale (formerly Ellisras), in the Limpopo Province of South Africa.

Project Schedule/Timetable	
Earliest Project Start Date	2015/08
When is the expected first year of CER delivery	2016
Project Lifetime	Twenty (20) years
Project End Date	2035
Crediting Period	*Has a crediting period for the project been identified?* *If yes - which option has been selected (10 years or X times 7 years, with reassessment of baseline for each 7 year renewal?* Yes – a ten (10) year crediting period has been chosen.

Project Schedule/Timetable	
Current Status or phase of the project	*Select most applicable:* *Under discussion/ planning/preparation/construction or other actions already commenced/ Other (explain)* Planning/preparation – a Pre-Feasibility Study (PFS) has been completed.
DNA Approval	*Has this project been submitted to the DNA for approval previously?* Apart from submitting the Project Identification Note (PIN) to the DNA in order to receive the Letter of No Objection (LONO), the Market Coke Waste Heat Recovery Project has not been submitted to the DNA for approval previously. *If yes – provide date of last submission and brief details of the response from the DNA (1 paragraph)* The positive LONO was received from the DNA on 29/09/2011.
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 Market Coke Waste Heat Recovery Project will seek an electricity generation license from the National Energy Regulator of South Africa (NERSA).

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?

The Market Coke Plant and Market Coke Waste Heat Recovery Plant are expected to have a net positive impact on the local, regional and national economy. Since the two plants are closely linked, benefits arising from both plants have been discussed below. At a local level, approximately 275 direct permanent jobs will be created during the operational lifetime of the Market Coke Plant and the Market Coke Waste Heat Recovery Plant, with many more temporary jobs expected to be created during the construction phase of the two plants.

The Market Coke Plant will produce coke for use in the local ferrochrome and steel industries, which would otherwise have been sourced internationally at significant cost to these local industries. The current trade deficit under the national balance of payments would also be impacted by any coke import requirements. Coke is beneficiated coal that produces little or no smoke and it is used as a reductant in many processes, such as steel smelting and stainless steel manufacture, of which ferrochrome is the main constituent. The Industrial Policy Action Plan (IPAP) of 2007 and IPAP 2 of 2010 includes beneficiation as a key factor to support and grow the South African economy and with the primary

process being the beneficiation of coal to produce coke, Exxaro is making a positive contribution in this regard. As can be seen from the figure below, beneficiated coal in the form of coke, leads to significant value addition.

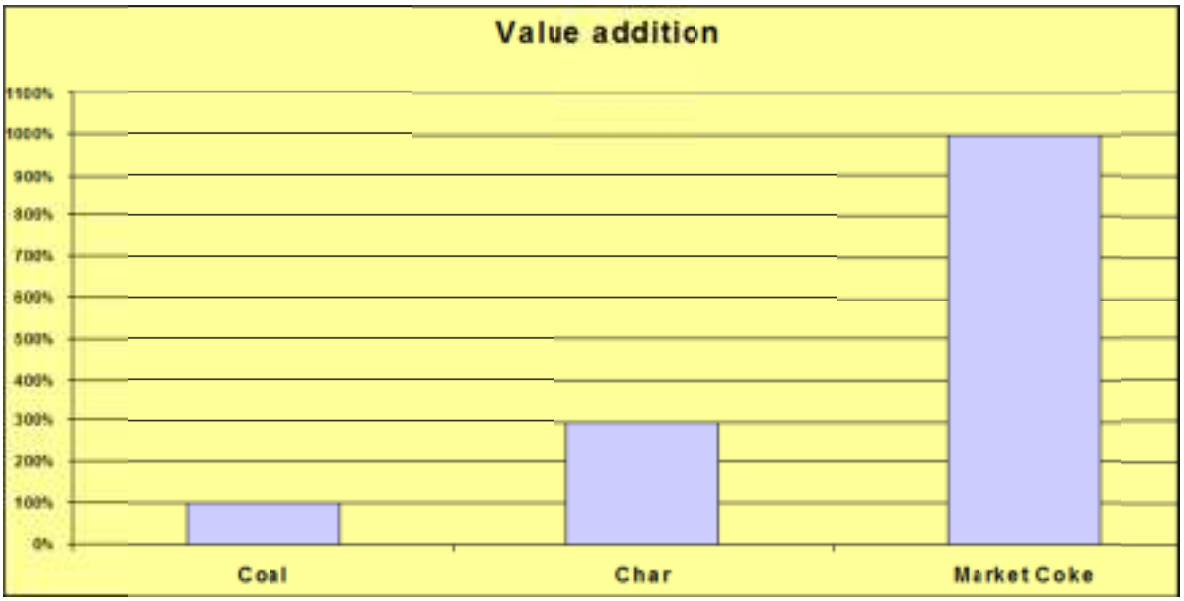

Figure 2: Value add achieved through coal beneficiation to market coke

Furthermore, the Market Coke Waste Heat Recovery Plant will displace some of the electricity supplied to the Grootegeluk Coal Mine from the national grid, lessening the burden on the available electricity supply and supporting national energy security objectives. At an installed capacity of 60MW, the plant is expected to supply most of the electricity consumed at the Grootegeluk Coal Mine, reducing electricity costs and ensuring the profitability of the mine as well as its ability to create and supply jobs to the local community.

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

As mentioned above, approximately 275 permanent jobs will be created. This will have a positive impact in an area where unemployment is high and 40-65% of households in the local townships earn less than R800 per month. Mining is a significant provider of local employment and secondary business and significant development of social infrastructure has occurred since mining and related activities commenced in the area. A number of schools, recreational facilities and a hospital have been established. The project will ensure that the sustainability of the social infrastructure and positive social impacts experienced thus far will continue well into the future.

Also, the procurement policy of the Grootegeluk Coal Mine favours local and Black Economic Empowerment (BEE) companies and the mine actively seeks engagement with such companies through an ongoing marketing campaign. This has resulted in a high level of success with the mine spending 24% of its procurement budget on BEE companies in 2004, exceeding its 2004 budget by 6.1%. In 2004 16.5% of the mine's procurement budget was spent in the Lephalale local municipal area of which 1.59% was spent with local BEE companies. In 2005 this had risen to 18.37% and 7.59% respectively.

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 project facility and project activity will be located within an existing mining area (the Grootegeluk Coal Mine), thereby avoiding the disturbance of ecosystems and loss of biodiversity potentially associated with "greenfields" sites. The plants will be located in close proximity to*

	the existing Char Manufacturing Plant and on an area currently utilsised as a construction laydown yard and is thus not likely to further impact the surrounding area. However, detailed specialist studies will be conducted during the ongoing EIA process, currently in the scoping phase. Specialist studies to be conducted include an air quality, surface water and ground water assessment.
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	*Pollution control and abatement systems are well incorporated into the design of the plant and will therefore significantly reduce pollution generation. Utilising dry (air) cooling as part of the process is a prime example of this and not only minimizes water requirements, but also avoids the potential for water pollution.*
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 project facility and project activity are not expected to disturb or impact any cultural heritage sites. The Grootegeluk Coal Mine has completed a phase one Heritage Impact Assessment for the entire mine, including the proposed site for the Market Coke and Market Coke Waste Heat Recovery Plants and found that as a result of unfavourable and somewhat inhospitable environmental conditions prevalent in the area, being hot, dry and with few sources of surface water, people did not settle in large numbers in the area in the past. Consequently only a few sites of cultural significance were identified in the study area. The Heritage Impact Assessment furthermore indicated that the closest archaeological and cultural heritage site to the mine, and therefore the proposed project site, is on the farm Nelsonskop, 3.16 km away. This latter site is however considered to be unique to the area, since, as mentioned above, unfavourable and generally inhospitable environmental conditions were not conducive to human settlement.*
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	*An Integrated Water and Waste Management Plan (IWWMP) has been compiled for the Grootegeluk Coal Mine which will be updated to include the Market Coke and Market Coke Waste Heat Recovery Plants. However, given the type of coke ovens utilised the project activity and project facility are not expected to result in the production of significant amounts of solid waste, effluent or potentially hazardous by-products. Moreover, general and hazardous waste (such as used oil) disposal will tie in with the current practices and facilities of the Grootegeluk Coal Mine.*
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	*Beneficiation, converting semi soft coking coal into market coke, is central to the project and can be seen as the responsible and equitable use of non-renewable resources. As mentioned above, beneficiation leads to significant value add in terms of commodity prices which will have a direct positive benefit for the local community, as well as nationally. Taking into account the depletion of the resource, the Market Coke Waste Heat Recovery Plant will utilise waste heat to produce a significant amount of electricity. By utilising waste heat, essentially a by-product of the coke manufacturing process, to produce added products in the form of electricity, the coal resources are utilised to their maximum benefit.*
vi) That the **development, use and exploitation of renewable resources is responsible and equitable**, and takes	*Water is often viewed as a renewable resource, but only if utilised responsibly. The Market Coke Waste Heat Recovery Plant will utilise dry*

into account the consequences of the depletion of the resource.	*cooling as opposed to wet cooling which utilises water, considerably reducing the amount of water consumed by the plant. Dry cooling again considerably reduces the amount of water utilised by the plant, and contributes positively to the use of a renewable resource.*
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	*A risk averse and cautious approach is applied and adopted into the ongoing EIA, which employs the "precautionary principle" to assess the environmental impacts from the project facility and project activity. Specifically, the EIA incorporates specialist studies into air quality, surface water and ground water quality, and social and economic impacts. Moreover, the precautionary principle will be applied when identifying mitigation measures for anticipated environmental impacts. The significance of environmental impacts will be rated before and after the implementation of mitigation measures and the impact rating system considers the confidence level (precautionary principle) that can be placed on the successful implementation of the mitigation measure.*
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 EIA will utilize a recognised impact assessment methodology in line with best practice. The methodology used for assessing impacts associated with the proposed project follows the philosophy of environmental impact assessments, as described in the booklet Impact Significance, Integrated Environmental Management Information Series 5 (DEAT, 2002). The identification and assessment of environmental impacts is a multi-faceted process, using a combination of quantitative and qualitative descriptions and evaluations. It involves applying scientific measurements and professional judgment to determine the significance of environmental impacts associated with the proposed project. Mitigation measures will be employed where environmental impacts cannot be altogether prevented.*

Other comments

Please provide any other comments on how this project contributes to sustainable development in South Africa

The Market Coke and Market Coke Waste Heat Recovery Plants make important and noteworthy contributions to the sustainable development of South Africa. Firstly, the beneficiation of coal to market coke adds major economic benefits to the local and national economy through the improved and boosted value add achieved. Also, should the project not proceed, market coke would need to be sourced internationally at high cost to the local steel and ferro-chrome industries.

Secondly, by employing the latest technologies as well as dry cooling, pollution control, abatement and resource efficiency is considerably enhanced through the project. Other than a reduced amount of atmospheric emissions, the project is not expected to produce significant amounts of other waste streams such as process effluent, solid wastes or potentially hazardous by-products. Thirdly, producing the equivalent of 55MW of power from the Market Coke Waste Heat Recovery Plant will help reduce the burden on the currently strained South African electricity reserve margin, and support wider energy sector investment and energy security objectives. Also, the Market Coke Waste Heat Recovery Plant is expected to result in significant GHG emissions reductions by displacing GHG intensive, fossil fuel based electricity from the South African national grid.

The growth of energy supplies in South Africa is considered critical to future economic development in the country, and will require large-scale investment in new generation capacity. The Market Coke and Market Coke Waste Heat Recovery Project will leverage private capital and investment to build the Market Coke Waste Heat Recovery Plant which will produce electricity to meet the Grootegeluk Coal Mine's electricity requirements, and in the process, make approximately 55MW available for consumption elsewhere in South Africa.

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)
			• Impact of the project on air quality
			  • A detailed Air Quality Impact Assessment will be undertaken as part of the EIA. However, through the use of modern technologies, emissions to the atmosphere are significantly reduced relative to conventional technologies, both in terms of quantity and of potentially hazardous substances released to atmosphere.
			• Impact of the project on water pollution
			  • The project activity is expected to have a net positive impact in terms of water pollution through the use of dry (air) cooling technology, avoiding potential water pollution. A detailed Surface and Ground Water Impact Assessment will also be completed as part of the ongoing EIA.
			• Impact of the project on the generation or disposal of solid waste
			  • As mentioned previously, the project facility and project activity are not expected to produce significant amounts of domestic, solid or hazardous waste (such as used oil). The IWWMP for the Grootegeluk Coal Mine will however be updated to include the Market Coke and Market Coke Waste Heat Recovery Plants so as to cater for solid waste streams produced.
			• Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic)
			  • A Traffic Impact Assessment will be conducted as part of the suite of specialist studies for the EIA. The project is not expected to have further negative environmental impacts, however the precautionary principle will apply to any uncertainties arising from potential environmental impacts. Overall, through the positive impacts of the project in terms of air and water, the project can be seen as having a net positive impact or benefit to the environmental, economic and social spheres.

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
			• Impact of the project on community access to natural resources
			  • The project site is located within an existing mining lease area, the Grootegeluk Coal Mine, and it is therefore not expected to impact 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 activity involves the utilisation of waste heat produced as part of the market coke manufacturing process to produce electricity. Not only does the project facility lead to an increase in beneficiation in South Africa, but it also utilises a non-renewable mineral, coal, to its maximum benefit through the production of electricity from the waste heat in the project activity. The use of water has been minimised through the design of the plant, specifically in the use of dry (air) cooling technology.

	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	• Changes in local or regional biodiversity arising from the project • Located within the existing Grootegeluk Coal Mine, the project facility and project activity will not affect local or regional biodiversity. The proposed project site is located on an area currently utilised as a construction laydown area within the mine, and as such will not affect “greenfields” sites on the mine further mitigating the disturbance of ecosystems and biodiversity.

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
			• Impact of the project on foreign exchange requirements
			  • The project facility will lead to a reduction of cash outflow from South Africa, since the coke produced from the project facility will be sold locally to the steel and ferrochrome industries which otherwise would have sourced the coke internationally. While the boilers and turbines for the project activity will be sourced internationally, resulting in an outflow of cash from South Africa, on balance the project facility and project activity will reduce cash outflow from South Africa. The value add from the beneficiation of coal to produce market coke significantly increases this positive impact.
			• Impact of the project on existing economic activity in the area
			  • The Grootegeluk Coal Mine contributes significantly to the local economy and the project facility and project activity are expected to enhance economic activity in the region through permanent and temporary job creation, the generation of additional local income streams and support to the Grootegeluk Coal Mine, thereby enhancing the contribution of mining activities to the local economy as well as ensuring the sustainability of the contribution.
			• Impact of the project on the cost of energy
			  • By displacing approximately 55MW of electricity demand from the national grid (with some of the Grootegeluk Coal Mine's future electricity needs to be met by the Market Coke Waste Heat Recovery Plant), the project activity can be expected to place downward pressure on national electricity prices. In essence, the project will reduce the avoided cost of electricity of 55MW sourced from the national grid, and will therefore not lead to an increase in the cost of electricity for South Africa.
			• Impact of the project on foreign direct investment
			  • The project activity will be 100% financed from equity provided by Exxaro. As mentioned above, the boilers and the turbines will be sourced internationally and the project activity will therefore have a net positive impact on foreign direct investment.

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
			• Positive or negative implications for the transfer of technology to South Africa arising from the project
			  • Tenders for the supply of technology will be sought both locally and internationally and it is reasonable to expect that while some technology will be sourced locally, some technology will be procured internationally and will lead to the positive transfer of technology to South Africa. This ensures a balanced approach to technology transfer by procuring goods and services locally contributing to local industry sustainability, while at the same time transferring appropriate skills and technology that cannot be provided locally.
			• Impacts of the project on local skills development
			  • Local skills development will be enhanced through the project activity by sourcing labour from local communities where appropriate and providing the required training and skills transfer.
			• Demonstration and replication potential of the project
			  • The Market Coke Waste Heat Recovery Project will build upon experience gained from the Namakwa Sands Cogeneration Project as well as the experience gained by Engineering, Procurement and Construction companies. Replication potential of the project is therefore high and can be extended to other industries within the South African economy where feasible.

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

	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)
			• How the project is aligned with provincial and national government objectives
			  • Beneficiation is a national government objective and as such the project facility is aligned and contributes positively to this objective. Furthermore, the project facility and project activity are closely aligned to the strategic priorities contained in the Limpopo Employment, Growth and Development Plan (LEGDP 2009-2014). The LEGDP calls for "ensuring more inclusive economic growth, decent work and sustainable livelihoods", all of which are central to both the project facility and project activity. The project facility and project activity are expected to contribute to economic growth in the region as well as create approximately 275 direct jobs for their operational lifetimes thereby ensuring "decent work and sustainable livelihoods".
			• How the project is aligned with local developmental objectives
			  • Both the Integrated Development Plans (IDPs) of the Lephalale Local Municipality and the Waterberg District Municipality recognise the importance of mining and its contribution to socio-economic development of the region. The project facility and project activity are closely linked to the mining activities in the area and are therefore well placed to contribute to the overall socio-economic development and value add achieved from mining activities.
			• Impact of the project on the provision of, or access to, basic services to the area
			  • Ongoing mining activities in the area have led to the establishment of social infrastructures such as schools, recreational facilities and a hospital and the project will contribute to the sustainability of these social infrastructures. A new road is also expected to be constructed to cater for the increased road traffic in the area, which is also to the benefit of increased provision of services in the area.
			• Impact of the project on the relocation of communities if applicable
			  • Not applicable (N/a). The project facility and project activity will not lead to the relocation of any communities.
			• Contribution of the project to any specific sectoral objectives (for example, renewable energy targets)
			  • The South African government during the 2009 COP15 announced conditional targets for the reduction of greenhouse gases released to the atmosphere. Known as the "peak, plateau and decline scenario", South Africa has conditionally agreed to the targets set under this scenario. The project will make a significant contribution to this target as it will mitigate a large amount of greenhouse gases that would otherwise have been released to the atmosphere.

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
			• 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)
			  • Approximately 275 direct jobs will be created during the operational lifetime of the Market Coke Plant and the Market Coke Cogeneration Plant, with many more jobs expected to be created during the construction phase of the two plants. Details as to job creation will be further highlighted as part of the EIA.
			• Impact of the project on community social structures
			  • As mentioned above, approximately 275 jobs will be created – which will have a positive impact in an area where unemployment is high and 40-65% of households in the local townships earn less than R800 per month. Mining is a significant provider of local employment and secondary business and significant development of social infrastructure has occurred since mining and related activities commenced in the area. Community social structures will be augmented by the project through the provision of jobs and skills development as well as ensuring the sustainability of social infrastructures created.
			• Impact of the project on social heritage
			  • The project is not expected to disturb or impact any cultural or social heritage sites. The Grootegeluk Coal Mine has completed a phase one Heritage Impact Assessment for the entire mine, including the proposed site for the Market Coke and Market Coke Cogeneration Plants and found that as a result of unfavourable and somewhat inhospitable environmental conditions prevalent in the area (being hot, dry and with few sources of surface water) people did not settle in large numbers in the area in the past. Consequently only a few sites of cultural significance were identified in the study area. The Heritage Impact Assessment furthermore indicated that the closest archaeological and cultural heritage site to the mine, and therefore the proposed project site, is on the farm Nelsonskop, 3.16 km away and is therefore far enough away not to be impacted by the project.
			• Impact of the project on the provision of social amenities to the community in which the project is situated
			  • Social infrastructures created such as schools, recreational facilities and a hospital will be augmented and sustained as a result of the project.
			• Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes
			  • The surrounding areas, where 40-65% of the households earn less than R800 per month, will benefit from the project. Mining is a significant provider of local employment and secondary business in the area.

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. • The project is not deemed to be economically feasible or justifiable without the revenues from CDM. As such, the decision to proceed with the project without CDM revenues would be affected and as a result the net positive impacts from the project would not be realised. CDM revenues are thus a key determinant for the Market Coke Waste Heat Recovery Plant to proceed and will create the ancillary benefits expected from the project. Thus, the benefits occurring from the project due to the contribution of the CDM are indeed reasonable and fair.

Part D: Finance

Project Costs	
Development Costs (R's)	N/a
Installed Costs (R's)	N/a
Other Costs (R's)	N/a
Total Project Costs (R's)	Approximately R1,300,000,000.00
Sources of Finance	
Equity	The project facility is at this stage expected to be funded 100% from Exxaro equity.
Debt (long term)	N/a
Debt (short term)	N/a
Amount not identified (R's)	N/a
Total CDM Contribution sought	The project activity is expected result in total estimated emissions reductions of approximately 4 509 120tCO_2e. An approximate CDM contribution has been quantified in the financial model.
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)	While no contract to purchase the CERs is in place, Exxaro has assumed a projected price for CERs that has been utilized in the financial model.
Indicate the **projected Internal Rate of Return** for the project with and without CER revenues.	IRR (without CER revenues): Approximately 6.5% IRR (with CER revenues): Approximately 8.1% It should be noted that both the IRR calculations shown above, without and with CER revenues, are below NERSA's published benchmark as described in the PDD.
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.* N/a
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.* N/a