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	Kathu Grid Connected 100 MW Solar Park, South Africa
Date of Submission of PDD	15 March 2012

Project Developer	
Name	Renewable Energy Investments of South Africa (Pty) Ltd (REISA)
Organizational Category	Private Company
Legal Status	Private Held Company
Street Address	1st Floor 106, Block A West Quay Building 7 West Quay Road Waterfront, 8001 Cape Town, South Africa
Postal Address (if different from above)	PO Box 51884 Waterfront 8002
Website Address	N/A

Main Activities	Development of renewable energy projects in South Africa
Summary of Financial Performance in last fiscal year	REISA is a private company and its financial results are not publicly available.
Contact Person(s)	Keith Kirby
Telephone	Cell: +27 (0)87 809 3114
Fax	+27 (0)86 557 2061
Email Address	keith.kirby@ventusaenergy.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	Blue World Carbon Asset Management (Pty) Ltd
Nature of partner	Carbon consultant
Organizational Category	Private company
Legal Status (if private company)	Limited company
Street Address	Suite 101, Block A 7 West Quay Road V&A Marina Cape Town, 8001 Republic of South Africa
Postal Address (if different to Street Address)	
Website Address	www.blueworldcarbon.com
Main Activities	Blue World Carbon (BWC) is the leading international company that specializes in developing solutions and rendering professional services in the sphere of climate change, greenhouse gas management and energy consulting.
Contact Person(s)	Joost van Lier (Managing Director, South Africa)
Telephone	Work: +27 (0)21 418 5368 Cell: +27 (0)71 609 2276
Fax	+27 (0)86 609 2770
Email Address	joost.van.lier@blueworldcarbon.com
Contractual Arrangements	
Contractual arrangements between various entities involved	REISA is the owner of the proposed project. The project will be split into two phases and each phase will be run by an individual Special Purpose Vehicles (SPV). BWC will act as a carbon consultant to develop all necessary documentation for project approval by the CDM Executive Board and selling GHG emission reductions in the international market.

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

Technical Summary of the project	
Objective of the Project	The aim of the project is to supply clean electricity to the grid of the Republic of South Africa.
Project Description The project development envisages the construction and operation of a solar park with a maximum generating capacity of 100 MW. The solar park will be equipped with a cluster of photovoltaic (PV) panel arrays. There will be an on-site substation and transformer to step up the power generated from the PV panels and to facilitate the connection between the facility itself and the Eskom electricity grid. It is planned that the project will be developed in two phases: phase 1 – 75 MW, phase 2 – 25 MW, which will be implemented concurrently. Solar panels use the energy from the sun to generate electricity through a process known as the photovoltaic effect, which refers to photons of light transferring electrons into a higher state of energy to create electricity. A solar panel is a packaged interconnected assembly of photovoltaic cells. A PV cell is made of silicon which acts as a semiconductor used to produce the photovoltaic effect.	
Project Constraints There are no constraints.	
Technology to be employed	The solar park will be equipped with several arrays of photovoltaic panels. Manufacturers and suppliers of the panels will be specified later. The proposed technology is well-proven and widely used internationally. Nevertheless there are no large solar parks in South Africa so far, only small-scale installations. REISA itself does not have experience with operating the proposed technology. However one of the company's owners has experience and expertise with operating solar parks in Europe.
Greenhouse Gases Targeted	Implementation of the project will lead to reduction of greenhouse gas (GHG) emissions from combustion of fossil fuel for electricity generation at the grid connected power plants. The principal GHG released during combustion of fossil fuel is CO_2. Emissions of CH_4 and N_2O from combustion of fossil fuel are negligibly small as compared with CO_2 emissions and excluded for simplification.

<table>
<tr><th colspan="2">Technical Summary of the project</th></tr>
<tr><td>Emission reductions</td><td>The total emission reductions at the end of the 7-year crediting period is expected to be 1 332 849 t CO_2e, as indicated in the following table:
<table>
<tr><th>Year</th><th>Volume, t CO2e</th></tr>
<tr><td>2014</td><td>158 673</td></tr>
<tr><td>2015</td><td>190 407</td></tr>
<tr><td>2016</td><td>190 407</td></tr>
<tr><td>2017</td><td>190 407</td></tr>
<tr><td>2018</td><td>190 407</td></tr>
<tr><td>2019</td><td>190 407</td></tr>
<tr><td>2020</td><td>190 407</td></tr>
<tr><td>2021</td><td>31 734</td></tr>
</table>
Starting date of the crediting period is the 1st of March 2014.</td></tr>
<tr><td>Baseline & Additionality Assessment</td><td>Approved consolidated baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version 12.2.0)[1] is used for this project. This methodology is applicable to grid-connected renewable power generation project activities including the construction of a solar park.

Additionality of the project activity will be demonstrated using the “Tool for the demonstration and assessment of additionality” (Version 06.0.0)[2] agreed by the CDM Executive Board. The main emphasis is made on investment analyses. The project is additional as defined under the Kyoto Protocol because the economic parameters of the project (IRR), based on the preliminary estimation, without the CDM are unacceptably low.</td></tr>
<tr><td>Monitoring</td><td>Approved consolidated baseline and monitoring methodology ACM0002: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” will be used for project monitoring.

The parameter to be monitored is quantity of net electricity generation supplied by the solar park to the grid of the Republic of South Africa.</td></tr>
<tr><td>Type of project/activities</td><td>Energy Supply</td></tr>
<tr><td>a. Energy Supply</td><td>Renewable Energy (excluding biomass)

The project is aimed at electricity generation using solar energy. Produced electricity will be supplied to the grid of the Republic of South Africa.</td></tr>
</table>

[1] http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf/history_view

Technical Summary of the project	
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 includes the proposed solar park and the grid of the Republic of South Africa.	
Indicate Emissions outside the Project Boundary	N/A

Location of the Project	
Province	Northern Cape Province
Municipality	Gamagara Local
Nearest city/large town	Kathu
Brief description of the location of the project site	The Project activity is proposed on Portion 4 of the Farm Wincanton 472, which lies approximately 16km North-West of the town of Kathu, 50km West of Kuruman, and 2km East of the small township of Dibeng. Geographical latitude: 27º35'00" S. Geographical longitude: 25º40' 00"E. Time zone: GMT +02:00

P**roject Schedule/Timetable**	
Earliest Project Start Date	2012/07 (Start of Construction) 2014/03 (Start of Commissioning)
When is the expected first year of CER delivery	2015
Project Lifetime	20 Years
Project End Date	2034/02
Crediting Period	7 year renewable crediting period
Current Status or phase of the project	At the moment, the project conducted the following activities: • The Final Environmental Impact Report is completed • Record of decision has been obtained • The Feasibility Study is completed • The Draft Validation Report from DOE (Carbon Check) has

Project Schedule/Timetable	
	been received. • The PDD has been drafted by BWC • The project has been listed as a preferred bidder under the Independent Power Producer Procurement Program (IPPPP) • Awaiting a PPA from the Department of Energy
DNA Approval	The project has not been previously submitted to the DNA for approval. A Project Identification Note (PIN) was submitted and a letter of no objection was received on 08/02/2012
Approval by other bodies	The project (or any elements of the project) has not been submitted to any other national, provincial or local government departments or agencies for regulatory or legal approval (excluding EIA process – see Part C).

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?

Yes. Worldwide expansion of the renewable energy industry points to the sustainable development of the country's economy. The implementation of the proposed project will promote development of PV solar parks in the RSA which in turn will lead to the creation of new job opportunities both during the construction and operation phases. The implementation of solar parks will make a contribution to achieve the objective to reduce South Africa's GHG emissions below the current emissions baseline of around 34% by 2020, and contribute to the 1450 MW solar PV set out in accordance with the capacity allocated to renewable energy generation in IRP 2010-2030 [http://www.ipp-renewables.co.za/].

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

Yes. The project will ensure the creation of new job opportunities.

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

Yes. The Environmental Impact Assessment (EIA) of the proposed project was carried out in accordance with the South African legislation by Savannah Environmental (Pty) Ltd. The draft Environmental Impact Report (EIR) was published for public review and comment over a period of 30 days from 22 November 2010. Hereafter the final EIR was submitted to the Department of Environmental Affairs (DEA) in January 2011 for a decision. On 26 September 2011 the Record of Decision (ROD) for phase 1 (75 MW) was obtained and the RoD for phase 2 (25 MW) was obtained on the 29 February 2012, and herewith Environmental Authorisation was granted for the Kathu Solar Park.

i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	The total area of the project site is approximately 7 km^2. The construction of the solar park and the associated disturbance of the vegetation may impact on the ecology, flora and fauna of the site. A detailed final EIA has been completed. Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the facility and associated

	infrastructure, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the application of the proposed Kathu Solar Energy Facility can be mitigated to an acceptable level. In terms of this conclusion, the EIA project team support the decision for environmental authorisation. Practical and achievable mitigation measures are recommended in order to minimize potentially significant impacts identified. These recommendations will be included within the Environmental Management Plan.
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	The project implementation will not lead to pollution and degradation of the environment. Combustion of fossil fuels (mostly coal) at the Eskom power stations and hereby emissions of the harmful substances into the atmosphere, such as flue ash, oxides of sulphur and nitrogen will be reduced due to the project implementation.
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 total area of the project site is approximately 7 km^2. The construction of the solar park and the associated disturbance of the vegetation may impact on the ecology, flora and fauna of the site. A detailed final EIA has been completed. Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the facility and associated infrastructure, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the application of the proposed Kathu Solar Energy Facility can be mitigated to an acceptable level. In terms of this conclusion, the EIA project team support the decision for environmental authorisation. Practical and achievable mitigation measures are recommended in order to minimize potentially significant impacts identified. These recommendations will be included within the Environmental Management 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	The project implementation will not lead to any changes in waste management.
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	There are no non-renewable resources to be used in this project.
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.	The proposed project does not affect on the depletion of renewable resources. Solar energy is an inexhaustible source of the renewable energy.
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 project implementation will only be started when REISA management has completed a full financial and technical evaluation. The technology to be applied has been tested and proven overseas and carries no negative consequences.
vii) That **negative impacts on the environment and on people's environmental rights** be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied	The project implementation will lead to mitigation of the negative environmental impact. Combustion of fossil fuels (mostly coal) at the Eskom power stations and hereby emissions of the harmful substances into the atmosphere, such as flue ash, oxides of sulphur and nitrogen will be reduced due to the project implementation.

Other comments

South Africa is anticipating another shortage of electricity supply due to the higher than anticipated economic growth combined with a number of technical factors such as overloaded electricity lines. The country is blessed with an abundance of fossil fuels, but the use of these resources in power production is becoming increasingly difficult as international pressure mounts against countries that do not comply with strict sustainable environmental policies. Solar parks do not only meet environmental requirements, but also provide a much needed additional source of electricity. In addition, the implementation of solar parks makes a contribution to achievement of the goal to generate 10 000 GWh of electricity from renewable energy by 2013.

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 implementation will positively impact on air quality due to reduction of combustion of fossil fuels (mostly coal) at the grid-connected power plants. The project will not impact on water pollution and solid waste. Construction phase may impact on sensitive receptors (i.e. nearby residents). The solar park has predominantly low-medium significance in terms of the visual impact according to the EIA. No Environmental fatal flaws were identified with the establishment of project according to the EIA.
	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 total area of the project site is approximately 7 km2. According to the EIA the project was rated as having a predominately low to medium potential significance in terms of the geology, soil and erosion potential. No Environmental fatal flaws were identified with the establishment of project according to the EIA. The project will lead to reduction of fossil fuel consumption at grid-connected power plants.
	Impacts on biodiversity and ecosystems	• Changes in local or regional biodiversity arising from the project	The project was rated as having a predominately low to medium potential significance in terms of the ecology. No Environmental fatal flaws were identified with the establishment of project according to the EIA.

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 impact on foreign exchange requirements as the main technological equipment of the solar park such as solar panels and tracker systems can only be sourced from overseas suppliers. There will be some increase in skilled labour requirements to operate the solar park. Potentially new manufacturing capacities will be generated in the Republic of South Africa to cater for growing demand of solar panels. The project implementation will not affect the electricity price since the solar parks are not able to compete with coal-fired power plants because of the higher cost price of electricity generation. Sale of carbon credits generated by the project will result in increased foreign direct investment. The solar park could become an attraction or a landmark within the region which people would want to see. It could become a tourist attraction in its own right and complement the existing tourism attraction in the area, thereby resulting in promoting a positive image of the area with resultant positive impact on the local tourism industry, economy and environment.
	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 some increase in skilled labour requirements to operate the new technology. The project will demonstrate potential of power production from solar energy in South Africa. Similar projects can be deployed in other regions of the country.

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)	Expansion of the renewable energy industry in the province points to the sustainable development of the region and the whole country. The project implementation promotes development of the county energy system and creates new job opportunities in the region. At the same time the project does not negatively affect any local industries as implemented on unused land. It is worthwhile to say that the implementation of solar parks will make a contribution to achieve the objective to reduce South Africa's GHG emissions below the current emissions baseline of around 34% by 2020.
	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	It is expected that impact on employment levels and skills development opportunities will be positive. The potential negative social impacts are linked to the impact on local road surfaces associated with the transport of heavy components and the impact on local communities and current farming activities associated with the presence of construction workers on the site. The project was rated as having a predominately moderate significance in terms of the social impacts. It would not result in permanently damaging social impacts and that the socio-economic benefits associated with the facility outweigh the negative social impacts. There will be a creation of between 80-110 jobs during the construction phase and approximately 10 jobs during the operation phase. In terms of heritage resource, the potential significance was rated as having a predominately low significance according to the EIA.

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?	The distribution of the project benefits is deemed to be reasonable and fair because they contribute to technological development of the country, improvement of the environmental situation and increase of the employment level.

Part D: Finance

<table>
<tr><td colspan="2">Project Costs</td></tr>
<tr><td>Development Costs (R's)</td><td></td></tr>
<tr><td>Installed Costs (R's)</td><td></td></tr>
<tr><td>Other Costs (R's)</td><td></td></tr>
<tr><td>Total Project Costs (R's)</td><td>R 2 436 million</td></tr>
<tr><td colspan="2">Sources of Finance</td></tr>
<tr><td>Equity</td><td>Not applicable</td></tr>
<tr><td>Debt (long term)</td><td>Not applicable</td></tr>
<tr><td>Debt (short term)</td><td>Not applicable</td></tr>
<tr><td>Amount not identified (R's)</td><td>R 2 436 million</td></tr>
<tr><td>Total CDM Contribution sought</td><td>Due to the fast approaching end of the Kyoto commitment period the CDM revenue has become risky to investors. The estimated price of CERs is therefore difficult to estimate accurately.

Expected CER's for this project over the first 7 year commitment period:

<table>
<tr><th>Year</th><th>Million Rand from sale of CDM revenue (assuming R50/CER)</th></tr>
<tr><td>2014 (from 01/03 to 31/12)</td><td>7.93</td></tr>
<tr><td>2015</td><td>9.52</td></tr>
<tr><td>2016</td><td>9.52</td></tr>
<tr><td>2017</td><td>9.52</td></tr>
<tr><td>2018</td><td>9.52</td></tr>
<tr><td>2019</td><td>9.52</td></tr>
<tr><td>2020</td><td>9.52</td></tr>
<tr><td>2021 (from 01/01 to 28/02)</td><td>1.59</td></tr>
<tr><td>Average</td><td>9.52</td></tr>
<tr><td>Total</td><td>66.64</td></tr>
</table>
</td></tr>
<tr><td>Expected Price of CER in case of a contract to purchase for:

A period of 7 years</td><td>R 50 (Assumed CER value at the start of the project activity.)

A 7 year renewable crediting period was chosen for the project. The project may be renewed twice, and the total crediting period may not be more than 21 years.</td></tr>
<tr><td>Indicate the projected Internal Rate of Return for the project with and</td><td>Not available at this stage.</td></tr>
</table>

without CER revenues.	
Constraints on tradability of carbon credits	There are no constraints yet. It is anticipated that there may be constraints with the tradability of carbon credits post 2012. This is dependent on whether a new commitment period under the Kyoto agreement can be established.
Preliminary discussions with potential purchasers	Preliminary discussions have not taken place. The discussions will commence upon registration of the project by the EB.