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	South African Large Scale Grid Connected Solar Park Programme (also referred to as 'this PoA')
Date of Submission of PDD	03/09/2012

Project Developer	
Name	Blue World Carbon Asset Management (Pty) Ltd (also referred to as 'BWC')
Organizational Category	Private company
Legal Status	Limited company
Street Address	Suite 102, Block A 7 West Quay Road V&A Marina Cape Town, 8001 Republic of South Africa
Postal Address (if different from above)	

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, Clean Development Mechanism (CDM), greenhouse gas management and energy consulting.
Summary of Financial Performance in last fiscal year	Capital expenditure phase
Contact Person(s)	Joost van Lier (Managing Director, South Africa)
Telephone	Work: +27 (0)82 607 1440 Cell: +27 (0)71 609 2276
Fax	+27 (0)86 609 2770
Email Address	joost.van.lier@blueworldcarbon.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	Lylaserve (Pty) Ltd (Hereinafter referred to as 'Lylaserve')
Nature of partner	A solar park developer that seeks to list their project under the present Programme of Activities (PoA). Lylaserve is the first CDM Programme Activity (CPA) under the present PoA.
Organizational Category	Private company
Legal Status (if private company)	Limited company
Street Address	Woodlands Drive The Woodlands, Building 30 Woodmead Johannesburg, South Africa 2191
Postal Address (if different to Street Address)	
Website Address	http://www.aveng.co.za/
Main Activities	Lylaserve (Pty) Ltd is a Special Purpose Vehicle (SPV) established to operate and manage solar parks in the Republic of South Africa (RSA).
Contact Person(s)	Mr. du Plessis
Telephone	+27 (0)87 807 0143
Fax	
Email Address	pieterd@aveng.co.za
Contractual Arrangements	
Contractual arrangements	BWC is a coordinating and managing entity of the PoA. BWC will

between various entities involved	act as a carbon consultant to develop all necessary CDM documentation, conduct procedures for PoA approval by the CDM Executive Board, direct CPA inclusion, monitor CPAs, and sell CERs in the international market for all CPAs under the PoA. BWC receives a fee for their services. Lylaserve is the first CPA under this PoA.

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

Technical Summary of the project	
Objective of the Project	The aim of the programme is to supply clean electricity to the grid of the Republic of South Africa (RSA).
Project Description The main objective of the South African Large Scale Grid Connected Solar Park Programme is to contribute to the development and promotion of RE in the RSA by building a framework to secure carbon revenue for solar park developers. The programme seeks to develop a series of grid connected solar power projects that supply clean electricity to either the national grid of the RSA or an identified consumer via RSA's grid. CDM programme activities (CPAs) included into this programme envisage the installation and operation of a solar park on a site where no solar park has been operated prior to the implementation of the CPA (Greenfield installation) as well as the capacity addition of an existing solar park. Participation in this programme will enable the solar park developers to overcome the political and financial barriers and uncertainties associated with RE development in the RSA as well as to increase the economic viability of solar park construction projects due to the revenue from selling CERs. The reduction of GHG emissions as a result of the implementation of CPAs will be achieved due to reduction of CO_2 emissions from combustion of fossil fuel at the existing grid-connected power plants and plants which would likely be built in the absence of the CPAs. The first CPA (CPA001) envisages the installation of a new grid connected solar park with an installed capacity of 25 MW, at a site where no solar park was operated prior to the implementation of the CPA. The solar park forms part of the Sishen Solar Energy Facility.	
Project Constraints: There are no constraints	
Technology to be employed	Each CPA under this PoA envisages the construction and operation of either a solar park or a capacity addition of an existing solar park. A solar park is a type of power plant where the sunlight is converted into electricity. Such power plants may use the following technologies, but are not limited to: Photovoltaics (PV) and Concentrated Solar Power (CSP). The term photovoltaic describes a solid-state electronic cell that produces direct current electrical energy from the radiant energy of the sun. "Photo" refers to light and "voltaic" to voltage. Solar cells are made of semi-conducting material, most commonly silicon, coated with special additives. When light strikes the cell, electrons are knocked loose from the silicon atoms and flows in a built-in circuit, producing electricity. If a load is connected under these conditions, an electrical current will result, which is capable of doing work. The current produced is proportional to the amount of light absorbed by the device. In a solar cell the photovoltaic

<table>
<tr><th colspan="2">Technical Summary of the project</th></tr>
<tr><td></td><td>effect is manifested as the generation of voltage at its terminals while being struck by the sun's rays. A solar panel is a packaged interconnected assembly of photovoltaic cells. A PV solar park consists of several arrays of photovoltaic panels connected with each other to produce electricity.

Concentrated solar power (also called concentrating solar power and CSP) systems use mirrors or lenses to concentrate a large area of sunlight, onto a small area. This type of technologies is also called 'solar thermal energy'. Electrical power is produced when the concentrated light is converted to heat, which drives a heat engine (usually a steam turbine) connected to an electrical power generator. This technology also allows for the storage of thermal energy which can be used during the night.

The amount of electricity which is produced by the solar park is dependent on the irradiation intensity at the site and the type of technology. Solar-generated electricity will be supplied to either the national grid of the RSA or an identified consumer via the national grid.

The proposed technology is well-proven and widely used internationally. Nevertheless there are not many large scale solar parks in South Africa so far, only small-scale installations.

BWC itself does not have experience with operating the proposed technology. However the supplier of the solar equipment will have some experience in this field.</td></tr>
<tr><td>Greenhouse Gases Targeted</td><td>The implementation of the programme will lead to reduction of greenhouse gas (GHG) emissions from combustion of fossil fuel for electricity generation at 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.</td></tr>
<tr><td>Emission reductions</td><td>The starting date of the crediting period of CPA 001 is expected to be 01/01/2015. CPA 001 is a 25 MW solar park. The total emission reductions at the end of the first 7-year crediting period is expected to be 475 587 tCO_2.

<table>
<tr><th>Year</th><th>ER, tCO_2 /yr</th></tr>
<tr><td>2015 (From 01/01/2015 to 31/12/2015)[1]</td><td>67 941</td></tr>
<tr><td>2016</td><td>67 941</td></tr>
<tr><td>2017</td><td>67 941</td></tr>
<tr><td>2018</td><td>67 941</td></tr>
<tr><td>2019</td><td>67 941</td></tr>
<tr><td>2020</td><td>67 941</td></tr>
<tr><td>2021</td><td>67 941</td></tr>
</table>
</td></tr>
</table>

[1] Full calendar year

Technical Summary of the project	
Baseline & Additionality Assessment	Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.2.0) is used for activities under this PoA. This methodology is applicable to grid-connected renewable power generation project activities which includes the construction of solar parks. The additionality for activities under this PoA will be demonstrated at CPA level in accordance with the latest version (at the time of drafting the PoA-DD) of the "Tool for the demonstration and assessment of additionality" (Version 06.0.0). To demonstrate the additionality for each activity under a CPA the project developer will have to choose whether to apply an investment analysis, or investment and barrier analysis, together with the common practise analysis. The decision to demonstrate additionality on CPA level was governed by the variability of factors that affect the possible investment or barrier analysis. Over time factors like investment cost, electricity price and exchange rates may vary to such an extent that it surpasses the scope of a generic investment analysis in a PoA. Similarly, for a barrier analysis the state of political, market, technological and investment barriers may alter significantly over the course of the PoA.
Monitoring	This project will be monitored according to the monitoring rules provided in ACM0002. The parameter to be monitored is the quantity of net electricity generation supplied by the solar park to the grid of the RSA.
Type of project/activities	Energy Supply
a. Energy Supply	Renewable Energy (excluding biomass) The programme uses solar technologies to generate power. The produced electricity will be supplied to the grid of the RSA.
b. Energy Demand	Not Applicable
c. Industrial Process	Not Applicable
d. Transport	Not Applicable
e. Waste Management	Not Applicable
f. Forestry/ land use	Not Applicable
g. Other	Not Applicable
Project Boundary The project boundary encompasses the physical, geographical site of the renewable generation source.	
Indicate Emissions outside the Project Boundary	Not Applicable

NOTE: At the present time project specific information can only be given for the first CPA (CPA 001) under this PoA.

Location of the Project	
Province	Northern Cape Province (CPA 001) (The geographical boundary of this PoA is the boundary of the RSA, and therefore includes all provinces in the RSA.)
Municipality	Gamagara Local Municipality
Nearest city/large town	Kathu
Brief description of the location of the project site	The solar park is sited on the southern part of Portion 6 of the Farm Wincanton 472, which lies approximately 16 km north-west of the town of Kathu and 5 km east of the small township of Dibeng in the Northern Cape Province. The GPS co-ordinates of the location are 27°35'51" S latitude and 22°56'14" E longitude and it falls in the UTC+2:00 time zone.

Project Schedule/Timetable	
Earliest Project Start Date	01/01/2014 (Start date of construction of CPA 001)
When is the expected first year of CER delivery	2016 (The start date of crediting period is of CPA 001 is on the 01/01/2015)
Project Lifetime	28 years (lifetime of PoA)
Project End Date	31/12/2042 (28 years after start of crediting period)
Crediting Period	A 7 year crediting period with the option of renewal has been identified for CPAs under this PoA.
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 (ROD) has been obtained from the Department of Environmental Affairs. • The Feasibility Study is completed • The PoA, CPA Template and CPA 001 has was written by BWC and submitted to a DOE. • The Draft Validation Report from DOE (Carbon Check) has been received and is submitted with this application form. • Awaiting a PPA from the Department of Energy
DNA Approval	The programme has not been previously submitted to the DNA for approval.
Approval by other bodies	The programme (or any elements of the programme) 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 programme will promote development of 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 a programme for solar parks will make a contribution to achieve the objective to reduce the RSA's GHG emissions below the current emissions baseline of around 34% by 2020 and contribute to the 1450 MW for the new 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 programme 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 National Environmental Management Act 107 of 1998, amended in June 2010, governs Environmental Impact Assessment (EIA) and requires a scoping assessment and EIA or Basic Assessment (BA) depending on the nature of the activity. The localized impact of each CPA will need to be assessed individually, which justifies separate environmental analyses.

With Regard to the CPA 001:

The project owner appointed Savannah Environmental (Pty) Ltd to undertake the Scoping and Environmental Impact Assessment for the 25 MW Sishen Solar Energy Facility, which proposes to produce up to 100 MW.

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 03 October 2011 the Record of Decision (ROD) was obtained, and herewith Environmental Authorisation was granted for the Sishen Solar Park.

The potential impacts of the independent activities under the CPA are as follows.

i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied	In terms of ecology, the potential significance was rated as having a predominantly low to medium significance. One major vegetation type occurs in the study area, namely Kathu Bushveld, which is classified as Least Threatened. The site does not occur within any Centre of Floristic Endemism and the vegetation on site has relatively low conservation value despite being in a mostly natural state. Factors that may lead to parts of the study area having high ecological sensitivity are the presence of saline pans and the potential presence of a small number of plant and animal species of conservation concern. These species are, however, either in a low conservation status category or there is a low likelihood of them occurring on site.
ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied	The programme 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 programme 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	In terms of heritage resources, the potential significance was rated as having a predominantly low significance. Low density heritage traces were found in the development footprint areas. From an archaeological perspective the observed heritage resources either fall well outside of the proposed development footprint or are of low significance. Immediate reporting to relevant heritage authorities of any heritage discovered during any phase of development or operation of the facility will be

	required during the construction phase.
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 programme will produce minimal waste and such waste will be disposed of in a responsible manner. Such waste would be limited during operation phase to the minor waste from the site office and maintenance such as fluid changes. Fluids will be disposed of and/or recycled according to applicable standards and responsible practices.
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 negligible non-renewable resources to be used in this programme.
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 programme does not effect 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	Commercial solar parks are operational for up to 30 years. Operational risks are well known and will be mitigated.
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	Mitigation plans for potential disturbances will be implemented as identified by environmental specialists. 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 programme implementation.
Other comments The RSA 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 programme implementation will positively impact on air quality due to reduction of combustion of fossil fuels (mostly coal) at the grid-connected power plants. The programme will not have an impact on water pollution and solid waste. The negative impacts are associated with the presence of construction workers, impact of heavy vehicles, and possible loss of agricultural land. But their influence will be negligible. The placement of the facility and its associated infrastructure will have a visual impact on the natural scenic resources and rural character of this region, but this will be negligible. The construction of the power lines and substations will generally have a medium to low impacts on the ecology of the study area. The substations and associated power lines are not expected to create a major negative visual disturbance. Impacts for CPA 001 will be negligible.
	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	For CPA 001, 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 development will have no significant or long term impacts on avifauna. For CPA 001, 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 programme will have an impact on foreign exchange requirements as the main technological equipment of the solar park such as PV panels can only be sourced from foreign suppliers. There will be some increase in skilled labour requirements to operate or maintain the solar parks. There is a possibility that new manufacturing capacities will be generated in the RSA to accommodate the growing demand of solar panels. The programme 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. The sale of carbon credits generated by the programme will result in increased foreign direct investment.
	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. Some of the equipment used and the skills to implement such equipment will be imported from overseas. This will help to grow the skill base in the RSA. The skill transfer will especially concentrate on local employees in the engineering and maintenance sectors. The programme will demonstrate potential of power production from solar energy in the RSA. Since the RSA is at an early development phase and has ambitious targets for renewable energy in place for 2030 there is a high potential for replication of the technology.

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 programme implementation promotes development of the country's energy system and creates new job opportunities in the region. The programme partakes in the national bidding scheme for RSA's Renewable Energy Feed-In Tariffs. At the same time the programme does not negatively affect any local industries as implemented on unused deteriorated agricultural land. The implementation of solar parks will make a contribution to achieve the objective of reducing the RSA's GHG emissions below the current emissions baseline of around 34% by 2020. This programme will also contribute to the 1450 MW target for new solar PV set out in accordance with the capacity allocated to renewable energy generation in IRP 2010-2030 [http://www.ipp-renewables.co.za/].

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	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 approximately 400 jobs during the construction phase and approximately 16 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 programme benefits is deemed to be reasonable. It contributes to technological development of the country, creates jobs in the RSA and contributes to combat climate change by reducing GHGs. The revenue from carbon credits is vital because renewable technologies require higher capital investment compared to fossil fuel powered plants.

Part D: Finance

<table>
<tr><td colspan="2">Project Costs</td></tr>
<tr><td>Development Costs (R's)</td><td>Not applicable</td></tr>
<tr><td>Installed Costs (R's)</td><td>Not applicable</td></tr>
<tr><td>Other Costs (R's)</td><td>Not applicable</td></tr>
<tr><td>Total Project Costs (R's)</td><td>ZAR 743.8 million (from CPA 001)</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>ZAR 743.8 million (from CPA 001)</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. Accordingly the price per CER has fallen dramatically over the last year.
Expected CER's for this project over the first 7 year commitment period:
<table>
<tr><th>Year</th><th>ZAR from sale of CDM revenue (assuming R50/CER)</th></tr>
<tr><td>2015</td><td>3 397 050</td></tr>
<tr><td>2016</td><td>3 397 050</td></tr>
<tr><td>2017</td><td>3 397 050</td></tr>
<tr><td>2018</td><td>3 397 050</td></tr>
<tr><td>2019</td><td>3 397 050</td></tr>
<tr><td>2020</td><td>3 397 050</td></tr>
<tr><td>2021</td><td>3 397 050</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
(The assumed CER value at the start of the project activity. It may be significantly less.)
A 7 year crediting period with the option of renewal 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 without CER revenues.</td><td>Not available at present</td></tr>
<tr><td>Constraints on tradability of carbon credits</td><td>There are no constraints. It is anticipated that there may be constraints with the tradability of carbon credits post 2012.</td></tr>
</table>

Preliminary discussions with potential purchasers	Preliminary discussions have not taken place. The discussions will commence upon registration of the project by the EB.