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** | PoA Name: South Africa Renewable Energy Programme (SA-REP)<br>CPA Name: SA-REP - Greefspan 10MW Solar PV Project |
| **Date of Submission of PDD** | 13/03/2012 |

| **Project Developer** | |
|---|---|
| **Name** | Standard Bank Plc (CME for the Program of Activities) |
| **Organizational Category** | Public Company |
| **Legal Status** | Publically Traded Company |
| **Street Address** | 20 Gresham Street<br>London<br>EC2V 7JE<br>UK |
| **Postal Address (if different from above)** | - |
| **Website Address** | www.standardbank.com |
| **Main Activities** | Standard Bank Plc is a division of Standard Bank of South Africa Ltd and focuses on providing Financial services to the United Kingdom |

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| | market. |
| **Summary of Financial Performance in last fiscal year** | Normalised headline earnings for 2011 were R13,6 billion ($1,9 billion), total assets were over R1 497 billion (approximately $185 billion) and we employed approximately 52 000 people (including Liberty) across all geographies. Standard Bank's market capitalisation at 31 December 2011 was R157 billion (approximately $19 billion). |
| **Contact Person(s)** | Fenella Aouane |
| **Telephone** | Work: +44 20 3145 6890<br>Cell: +44 7824434777 |
| **Fax** | - |
| **Email Address** | Fenella.Aouane@standardbank.com |
| **Project Partners**<br>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** | AE-AMD Independent Power Producer 1 (Pty) Limited |
| **Nature of partner** | Standard Bank Plc is establishing a CDM Programme of Activities (PoA) which will reduce CDM transaction costs and facilitate the route to market for Certified Emission Reductions (CERs) generated by small-scale renewable energy projects in South Africa. This will ensure that financial viability of projects will be enhanced and access to capital facilitated. Standard Bank Plc will act as the CME for the programme and will also buy the CERS. AE-AMD Independent Power Producer 1 (Pty) Ltd. is the entity responsible of the first CPA, the project developer. |
| **Organizational Category** | *Private Company.* |
| **Legal Status (if private company)** | Limited Company. |
| **Street Address** | P.O. Box 5301, Cape Town 8000, South Africa |
| **Postal Address (if different to Street Address)** | - |
| **Website Address** | www.ae-amd.co.za |
| **Main Activities** | AE-AMD Independent Power Producer 1 (Pty) Ltd. is a Special Purpose Vehicle created by its mother company, AE-AMD Renewable Energy Ltd., a South African Company formed with the express purpose of identifying, evaluating, developing and operating renewable energy power plants in South Africa. AE-AMD plans to develop a portfolio of renewable energy projects in South Africa - within the context of incentives for renewable energy being considered by the South African Government.<br><br>AE-AMD currently has promoted four modular PV power plants in four different locations. All sites are located in the province of Northern Cape, next to an identified and power load available ESKOM substation. These power plants have been modularly designed in phases of 5 MW. The first of these projects is the Greefspan 10 MW Solar PV Project, developed by AE-AMD Independent Power Producer 1 (Pty) Ltd. |

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| **Contact Person(s)** | Tamuka Kaseke |
| **Telephone** | Work: +27 833 020 870<br>Cell: - |
| **Fax** | - |
| **Email Address** | tamuka@ae-amd.co.za |
| **Contractual Arrangements** | |
| **Contractual arrangements between various entities involved** | Standard Bank Plc will act as the Coordinating/Managing Entity. Standard Bank Plc will also buy the CERS generated by the Greefspan 10 MW Solar PV project and will act as the Focal Point. These have been stipulated in the CDM PoA Emission Reductions Purchase Agreement between AE-AMD Independent Power Producer 1 (Pty) Ltd. and Standard Bank Plc. |

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

| **Technical Summary of the project** | |
|---|---|
| **Objective of the Project** | The South Africa Renewable Energy Programme (SA-REP) will support the development and implementation of small-scale grid-connected renewable energy projects in South Africa and therefore reduce greenhouse gas (GHG) emissions. Renewable energy technologies implemented under the programme will include small hydro, wind, solar photovoltaic, solar thermal and geothermal. |

**Project Description**

The CPAs under the PoA will be located in South Africa and will use grid-connected renewable energy technologies to generate electricity. Renewable energy technologies and measures to be employed by a typical SSC-CPA in this PoA will include hydro, wind, solar photovoltaic (PV), solar thermal and geothermal. Project using renewable biomass are excluded from the programme. Installed capacities of individual SSC-CPAs will be below or equal to 15 MW.

The renewable energy generation units will either supply electricity to a national or regional grid, or to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.

The implementation of SSC-CPAs under the PoA will involve the installation of a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the CPA (greenfield plant). Capacity additions, retrofits and replacement of existing plants are not included in the PoA.

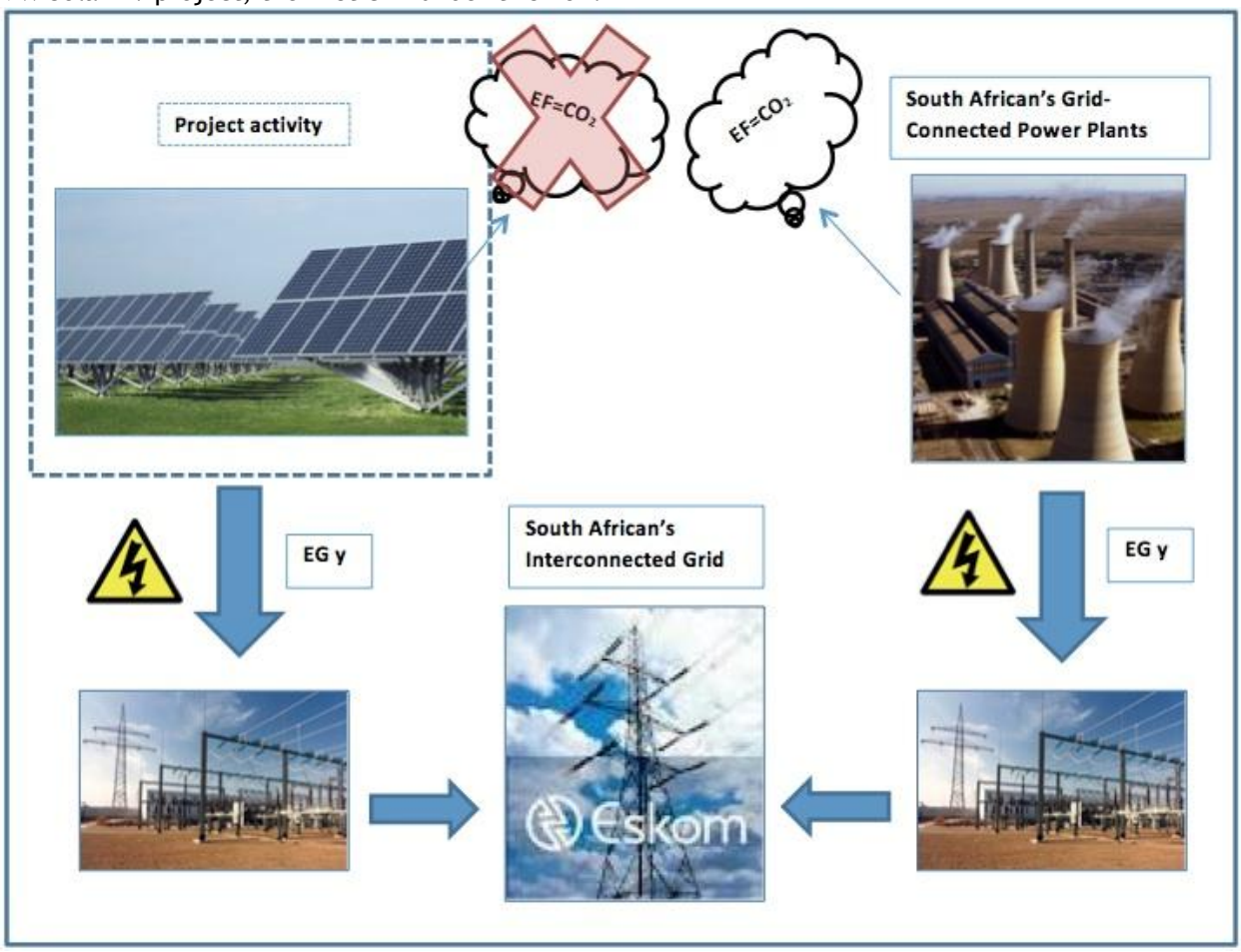
Project activities could include both renewable and non-renewable components (e.g. a wind/diesel power)

The Greefspan 10MW Solar PV Project is the first CPA under this PoA. It will install 10 MW of solar photovoltaic power and will be located on the road R-357, approximately 60km Southwest from Douglas in Pixley ka Seme district municipality, Northern Cape province in South Africa. The project will be connected to Eskom's Greefspan substation, which is located just next to the project site, through a 22 kV overhead power line. This project is expected to generate approximately 26,967 MWh annually resulting in annual emission reductions of 25,521 $tCO_2$ per year during the first crediting period.

## Technical Summary of the project

The project was selected as Preferred Bidder by the Department of Energy in the first bid submission.

The flow diagram below highlights the main activity involved in the implementation of the Greefspan 10 MW Solar PV project, the first CPA under this PoA.




**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.***

Small-scale, renewable energy projects with an installed capacity of smaller than or equal to 15 MW face considerable barriers, including lack of finance, inadequate tariffs and high cost of capital. This is especially relevant for Independent Power Producers (IPPs) The Greefspan 10MW Solar PV Project in particular has faced barriers in in terms of project development since the technology applied (solar PV) is relatively new in South Africa. Such renewable energy projects are also expensive to implement and therefore the project has sought extra revenue streams through the Clean Development Mechanism.

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| **Technology to be employed** | SSC-CPAs under this PoA will use renewable energy technologies to generate electricity. Renewable energy technologies and measures to be employed by a typical SSC-CPA will include hydro, wind, solar photovoltaic (PV), solar thermal and geothermal. |

| Technical Summary of the project | |
|---|---|
| | Installed capacities of individual SSC-CPAs will be below or equal to 15 MW. The renewable energy generation units will either supply electricity to a national or regional grid, or to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.<br><br>The Greefspan 10MW Solar PV Project, that is the first CPA in this PoA will use solar PV technology and supply this energy to the South African grid.<br><br>***Is the technology one that has been previously tried and tested in South Africa or internationally? If yes, provide details (1 paragraph)***<br><br>Some of the technology types under this programme have been implemented in South Africa while most of them have been implemented internationally, mostly in Europe, the US and China. However in South Africa, projects using renewable energy technology for grid connected electricity generation only represent less 1.5% of the total installed capacity. Hydro is practically the only technology deployed in this category, together with two small wind energy projects of 3.2 MW and 5.2 MW that constitute 0.02% of the total installed capacity.<br>No other projects of such magnitude and using photovoltaic technology currently exist in South Africa. However, solar PV panels for household applications are widely used in South Africa. Solar photovoltaic projects such as Greefspan are being widely developed all around the world, mainly Europe, US, and China.<br><br>***Have the project operators had any previous experience or expertise with operating the technology?***<br><br>*Yes.*<br>*Standard Bank as the CME of this PoA has had experience in the development and implementation of CDM Programmes. Currently Standard Bank is implementing similar programmes that will cover the East and West African Regions. AE-AMD has had previous experience in the formulation and implementation of renewable energy projects as well as the management of renewable energy turn key projects. The operation of the Greefspan 10 MW Solar PV project will be contracted to Tenesol/Sunpower. These companies have had experience and expertise in operations of the technology worldwide with more than 3,000 MW installed in total.* |
| **Greenhouse Gases Targeted** | The project will result in ***CO2*** emissions reductions from electricity generation in fossil fuel fired power plants that will be displaced due to project activity. |
| **Emission reductions** | Annual emission reductions for the Greefspan 10MW Solar PV Project, that is the first CPA in this PoA are estimated to be 25,521 tCO2e/yr<br>Total emission reductions for the same project during the first |

<table>
<tr><th colspan="2">Technical Summary of the project</th></tr>
<tr><td></td><td>crediting period are estimated to be 178,648 tCO2e<br>Emission reductions for the PoA will depend on the number of CPAs that will be included in the programme and so cannot be determined at this point.</td></tr>
<tr><td>Baseline & Additionality Assessment</td><td>
<u>Baseline</u><br><br>
In accordance with simplified baseline and monitoring methodology AMS-I.D (version 17) Grid connected renewable electricity generation, the baseline scenario is<br><br>
“the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid”.<br><br>
<u>Additionality</u><br><br>
The additionality for the PoA is demonstrated by establishing that each SSC-CPA is additional through eligibility criteria using either the Attachment A to Appendix B (EB 63 Annex 24 version 08) or Guidelines for demonstrating additionality of microscale project activities (EB 63 Annex 23 version 03). These documents provide various approaches that can be used for small scale projects including:<br><br>
<table>
<tr><td>Option A</td><td>Micro-scale additionality</td><td>Applicable if the project has<br>(1) A capacity of less than 5 MW and<br>(2) The project is located in a LDC/SID country<br>Or<br><br>The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country.</td></tr>
<tr><td>Option B 1</td><td>Investment barrier</td><td>In this case, the project will have to carry out an investment analysis to show that a financially more viable project would have resulted in higher emissions.</td></tr>
<tr><td>Option B2</td><td>Access to capital barrier</td><td>This is done to show that the project activity could not access appropriate capital without consideration of the</td></tr>
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</td></tr>
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| Technical Summary of the project | | | |
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| | | | CDM revenues. |
| | Option B3 | Barriers due to prevailing practice | This assessment should show that prevailing practice would have led to implementation of a technology with higher emissions. |
| | Option C | First of its kind additionality | This is applicable if the project is the first in the applicable geographical area that applies a technology that is different from any other technologies able to deliver the same output and that have started commercial operation in the applicable geographical area before the start date of the project. |
| | Option D | Automatic additionality | This applies in case the project activity involves a technology, which is on the positive list of grid-connected renewable electricity generation technologies defined in the Attachment A of Appendix B. These technologies include solar technologies (photo voltaic and solar thermal electricity generation), off-shore wind technology and marine technologies (wave and tidal) |
| | As each SSC-CPA will comply with the eligibility criteria on additionality, it can be concluded that in the absence of this PoA and CDM, none of the proposed SSC-CPAs would occur.<br><br>The Greefspan 10MW Solar PV Project, the first CPA in this PoA, uses solar PV technology. Solar PV technology is on the positive list of grid-connected renewable electricity generation technologies as specified in version 08 of Attachment A of Appendix B (EB 63 Annex 24 version 08) and as described in option D above hence the project is automatically additional. | | |
| **Monitoring** | Since the PoA will entail projects that will supply power to the South African grid system, or to identified consumer facilities via national/regional grid through a contractual arrangement such as wheeling, the key parameter that will be monitored is the *electricity generated and supplied to the grid operator* ($EG_{BL,y}$). Metering of this parameter will be conducted with calibrated measurement equipment according to relevant industry standards and following guidance from the NRS 057 standard provided by the National Energy Regulator of South Africa. This metering equipment will be installed at the point of connection with ESKOM. | | |

## Technical Summary of the project

Project activities using geothermal or hydro technologies or involving fossil fuel consumption for electricity generation (that result in project emissions) will monitor and keep records of the following additional parameters:

| Parameter | Description |
|---|---|
| $FC_{i,j,y}$ | Quantity of fuel type *i* combusted in process *j* during the year *y (applicable for projects that also use fossil fuel such as geothermal and solar)* |
| $TEG_Y$ | Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y (applicable for hydro projects that have reservoirs)* |
| $CAP_{PJ}$ | Installed capacity of the hydro power plant after the implementation of the project activity *(applicable for hydro projects that have reservoirs)* |
| $A_{PJ}$ | Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full *(applicable for hydro projects that have reservoirs)* |
| $w_{steam,CO2,y}$ | Average mass fraction of carbon dioxide in the produced steam in year *y* (applicable for geothermal projects) |
| $M_{steam,y}$ | Quantity of steam produced in year *y* (applicable for geothermal projects) |

For the Greefspan 10MW Solar PV Project, the only parameter that will require monitoring is the *electricity generated and supplied to the grid operator* ($EG_{BL,y}$) This will be metered as described above.

| **Type of project/activities** | |
|---|---|
| a. Energy Supply | Applicable. The program of activities will incorporate renewable energy project activities that will involve the generation of electricity from hydro, wind, solar photovoltaic (PV), solar thermal and geothermal energy. This electricity will be supplied to the national grid system. |
| 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**

This program of activities employs the approved baseline and monitoring methodology AMS-I.D (Version 17) that states that the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.
The flow diagram provided in part B above best illustrates the equipment and extent of the project boundary for the Greefspan 10 MW Solar PV project an example of a CPA in this PoA.

## Technical Summary of the project

The green house gas emission source included in the project boundary is CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to project activity. This constitutes the baseline emissions. Project emissions vary depending on the type of technology employed. The table provided below summarises the GHG emission sources:

| Source | | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| **Baseline** | CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to project activity | $CO_2$ | Yes | Main emission source |
| | | $CH_4$ | No | Minor emission source |
| | | $N_2O$ | No | Minor emission source |
| **Project Activity** | For geothermal power plants, fugitive emissions of CH4 and CO2 from non-condensable gases contained in geothermal steam | CO2 | [*In case of geothermal*] Yes [*Other Project*] No | Main emission source |
| | | $CH_4$ | [*In case of geothermal*] Yes [*Other Project*] No | Main emission source |
| | | $N_2O$ | No | Minor emission source |
| | CO2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants | $CO_2$ | [*In case of solar thermal or geothermal*] Yes [*Other Project*] No | Main emission source |
| | | $CH_4$ | No | Minor emission source |
| | | $N_2O$ | No | Minor emission source |
| | For hydro power plants, emissions of CH4 from the reservoir | $CO_2$ | No | Minor emission source |
| | | $CH_4$ | [*For hydro projects with reservoirs*] Yes [*Other Projects*] No | Main emission source |
| | | $N_2O$ | No | Minor emission source |

For the specific case of the Greefspan 10MW Solar PV Project, the emission source will be the baseline CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to project activity.

| Technical Summary of the project | |
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| Indicate Emissions outside the Project Boundary | *N/A* |

| **Location of the Project** (*The PoA will cover the whole Republic South Africa. Below is the description of the location of the Greefspan 10MW Solar PV Project - the CPA1)* | |
|---|---|
| **Province** | Northern Cape |
| **Municipality** | Pixley ka Seme district |
| **Nearest city/large town** | Douglas |
| **Brief description of the location of the project site** | The project will be located on the road R-357, approximately 60km Southwest from Douglas. The total area the project will occupy is approximately 44 ha. The project site is located in a remote area that is not an environmentally sensitive area. The project coordinates are as shown in the table below: |

| | Latitude | Longitude |
|---|---|---|
| North | 29°23'9.24"S | 23°18'53.75"E |
| East | 29°23'24.76"S | 23°18'58.35"E |
| South | 29°23'42.12"S | 23°18'38.41"E |
| West | 29°23'33.96"S | 23°18'18.29"E |

| **Project Schedule/Timetable** | |
|---|---|
| **Earliest Project Start Date** | *[For the PoA]*<br><br>*2012/05*<br><br>*[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>*2012/05* |
| **When is the expected first year of CER delivery** | *[For the PoA]*<br><br>*2014 (from the first CPA i.e. Greefspan* 10MW Solar PV Project<br><br>*[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>*2014* |
| **Project Lifetime** | *[For the PoA]*<br><br>*28 years*<br><br>*[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>*20 Years* |
| **Project End Date** | *[For the PoA]*<br><br>*2040/04* |

| Project Schedule/Timetable | |
|---|---|
| | *[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>*2032/04* |
| **Crediting Period** | ***Has a crediting period for the project been identified?***<br><br>*[For the PoA]*<br><br>*Yes*<br><br>*[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>*Yes*<br><br>***If yes – which option has been selected***<br><br>*[For the PoA]*<br><br>7-year renewable crediting period that will be thrice renewable.<br><br>*[For the CPA-DD-* Greefspan 10MW Solar PV Project*]*<br><br>7-year renewable crediting period that will be thrice renewable following guidelines provided in the *CDM Mechanism Project Standard* paragraph 161 (EB 65 Annex 5) |
| **Current Status or phase of the project** | The project is at its Preparation stage.<br><br>The Greefspan Project is in its preparation stage. It is expected to reach financial close in the month of August 2012. The project is a Preferred Bidder from the first bid submission.<br>The CDM project i.e. the PoA is in validation stage with site visit having been conducted on the 9th to the 11th of May 2012. |
| **DNA Approval** | ***Has this project been submitted to the DNA for approval previously?***<br><br>No<br><br>***If yes – provide date of last submission and brief details of the response from the DNA (1 paragraph)***<br><br>*N/A*<br><br>***Provide details of any other official response by the DNA regarding this project***<br><br>N/A |

| Project Schedule/Timetable | |
|---|---|
| **Approval by other bodies** | The first CPA of the PoA i.e. the Greefspan 10 MW Solar PV project has in accordance with South African regulations submitted and was chosen as a preferred bidder under the IPP procurement program by the South African Department of Energy. The project has also received a generation license from the National Energy Regulator for South Africa |

# 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. The project i.e. the Programme of Activities, is expected to contribute to national economic development.The programme will support the development and implementation of small-scale renewable energy projects in South Africa. These projects will contribute to the South Africa's fiscal revenues through payment of taxes, and are also expected to attract foreign direct investment. The project will also lead to technology transfer and improvement of skill in South Africa on the development, construction, operation and maintenance renewable energy power plants. This skill can be replicable for similar projects The Greefspan 10MW Solar PV Project is expected to lead to the stimulation and promotion of the regional economy, creation of new job opportunities, the avoidance of electricity price fluctuations and a reduction of fossil fuel due to reduced load replaced by the CPA's load production.

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

YES. The project i.e. the Programme of Activities, is expected to contribute to social development. The small-scale renewable energy projects in South Africa under this program will support the national policy goal of achieving 10% penetration for wind and solar PV technologies as a share of total installed capacity in 2020, and 20% in 2030. The project is also expected to provide local employment opportunities during the construction and operation phase of CPAs under the PoA, as well as provide transfer of technological know how and transfer of technology to South Africa since it will involve the development of various renewable energy projects. The programme implementation is expected to result in stable electricity supply in South Africa. The Greefspan 10MW Solar PV Project is expected to lead to the creation of employment opportunities. The project will also use local resources and employ a safe and stable technology that does not produce any dangerous wastes. AE AMD who are the CPA implementers will set up an educational fund for the residents on the Northern cape that will encourage the study of mathematics and engineering. Based on its agreement with the department of energy, approximately 1.5% of the projects revenue will go to social economic development initiatives.

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| **3. Environmental: Does the project conform to the National Environmental Management Act principles of sustainable development**?<br><br>Yes. The project conforms to the National Environmental Management Act principles of sustainable development as shown below. | |
| i) That the **disturbance of ecosystems and loss of biological diversity** are avoided, or where they cannot be avoided, are minimised and remedied | All projects under this PoA will comply with appropriate regulations applicable to the environment including the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. It is expected that the EIA process will address the issue of the specific CPA's possible effect (if any) on ecosystems and biological diversity.<br>According to the EIA report submitted to the Department of Environmental Affairs of South Africa, the Greefspan 10MW Solar PV Project is not located in a sensitive area or on biodiversity hotspots. However the project in its Environmental Management Programme describes the measures that will be taken to ensure minimal disturbance of the vegetation and especially where the vegetation will not interfere with the construction and minimize the risk of fauna and floral destruction |
| ii) That **pollution and degradation of the environment** are avoided, or where they cannot be altogether avoided, are minimised and remedied | As indicated above, all projects under this PoA will comply with the appropriate regulations applicable to the environment including the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. Therefore it is expected that the EIA process will address the issue of any possible pollution and degradation of the environment as a result of the specific CPA's under the PoA and provide mitigation in form of an Environmental Management Programme (EMP). The Greefspan 10 MW Solar PV project has carried put an EIA and has put together a proper EMP which highlights the mitigation measures that will be put into effect in order to minimize possible pollution that would occur during the construction and operation phase of the project specific CPA's. The South African Department of Environmental Affairs has approved these and issued a ROD. |
| 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 | All projects under this PoA will comply with the appropriate regulations applicable to the environment including the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. Therefore it is expected that the EIA process will address the issue of disturbance of landscapes and sites that constitute the nation's cultural heritage for each CPA to be included in the PoA. According to the EIA report prepared for the 10 MW |

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| | Greefspan project, an archaeological impact assessment as well as paleontological study was carried out that concluded that there are no significant heritage resources in the project site. Furthermore, mitigation measures in the event that such resources are discovered in the area have been described in the EMP. |
| 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 | As described above the specific CPA's that will constitute the programme of activities will comply with the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. The issue of waste avoidance and disposal will therefore be addressed as part of the EIA process for the specific CPAs. According to the EIA report prepared for the 10 MW Greefspan project, hazardous waste will be disposed off in impervious, closed bins and kept in a secure area at the site camp until safely removed by a suitably certified company. Proof of safe disposal will be kept on file. Clean and solid construction waste will be used to rehabilitate the nearest possible abandoned quarry. General wastes from the project employees at the operational phase of the project will also be disposed in a responsible manner and office paper and cardboard will be recycled as much as possible. Enviro loo system was proposed to be used at the project site during the operational phase of the project. This is an odorless, waterless on-site dry sanitation system that will pose a low risk of impacting the environment. More details on the waste avoidance and management procedures are outlined in the EMP. |
| 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 | The PoA will include CPA's implementing electricity generating projects such from hydro, wind, solar photovoltaic (PV), solar thermal and geothermal energy. These are considered renewable energy projects and as such there will be no exploitation of non-renwable resources. The Greefspan project will involve the implemetation of a 10 MW solar PV power plant therefore will not result in exploitation of non-renewablwe resources. |
| 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. | As described above |
| 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 | All projects under this PoA will comply with appropriate regulations applicable to the environment including the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. It is expected that the EIA process will address the underlined issue. This approach was applied in the EIA process for the 10 MW Greefspan Solar PV project. |
| vii) That **negative impacts on the environment and on people's environmental rights** be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied | The specific CPA's that will constitute the programme of activities will comply with the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. The EIA process will ensure 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. This was applied in the EIA conducted for the 10 MW Greefspan Solar PV Project. |
| **Other comments**<br>**Please provide any other comments on how this project contributes to sustainable development in South Africa *(optional)*** | |

No additional comments.

| Indicators in Support of the Project Approval Criteria | | | |
|---|---|---|---|
| **Category** | | **Indicator** | **Comment** |
| **Environmental** | Impact on local environmental quality | • Impact of the project on air quality<br>• Impact of the project on water pollution<br>• Impact of the project on the generation or disposal of solid waste<br>• Any other positive or negative environmental impacts of the project (such as impacts on noise, safety, visual impacts, or traffic) | All projects under this PoA will comply with appropriate regulations applicable to the environment including the National Environmental Management Act (NEMA) Environmental Impact Assessment regulations wherein is specified the type of projects that require an EIA assessment, either a basic assessment or scoping report. Such impacts would therefore be addressed on the specific CPA level.<br>• Air quality: All the projects under this Programme of Activities are expected to result in an improvement of the air quality since they will result in a reduction of CO2 emissions from electricity generation in fossil fuel fired power plants that will be displaced as a result of the implementation of the projects. The emission reductions will be monitored as required under the CDM.<br>• Water pollution: According to the 10 MW Greefspan project EIA report, the project is expected to have minimal impacts on water resources. The possible impacts on ground water are considered negligible since the project will use surface water from the Orange and or Vaal River. The Orange Vaal Water Users Association has confirmed water availability. Besides various measures have been outlined in the EMP that will minimize on water pollution as a result of the construction and implementation of the project activity.<br>• Waste: The EIA report for the 10 MW Greefspan project also indicates that the wastes generated by the project at the operation stage would not be more than that generated by more than 2 households and as such will be insignificant in quantity.<br>• Visual Impact: The project is expected to have visual impact on the users of the roads, farm homesteads in the vicinity, and tourists using the provincial road. As a result is expected that the project could become a tourist attraction or a landmark within the region. |

| Indicators in Support of the Project Approval Criteria | | | |
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| **Category** | | **Indicator** | **Comment** |
| | Change in usage of natural resources | • Impact of the project on community access to natural resources<br>• Impact of the project on the sustainability of use of water, minerals or other non renewable natural resources<br>• Impact of the project on the efficiency of resource utilisation | • Impact on community access to natural resources: The programme of activities will allow the South African population to access the country's renewable energy resources. For Greefspan project, apart from the above, the community has not been accessing the particular area where the project is located as it is of no value, therefore there is no impact.<br>• Efficiency of resource utilization/ sustainability of use of non renewable natural resources: The projects under this programme of activities will employ renewable energy technologies such as wind, solar, hydro and geothermal in order to generate electricity. This will result in a diversification of the electricity generation sources resulting in possible reduction in coal use in the generation of electricity hence efficiency and sustainability of coal utilization. |
| | Impacts on biodiversity and ecosystems | • Changes in local or regional biodiversity arising from the project | • Impacts on biodiversity: Since typical projects under this programme will comply with the environmental regulations, an EIA will be condicted that will show and capture any impacts of the project to the biodiversity. The Greefspan 10 MW solar project that forms the first CPA in the project is expected to have minimal impacts on the areas biodiversity since the project area is considered to be of low value. |

| Indicators in Support of the Project Approval Criteria | | | |
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| **Category** | | **Indicator** | **Comment** |
| **Economic** | Economic impacts | • Impact of the project on foreign exchange requirements<br>• Impact of the project on existing economic activity in the area<br>• Impact of the project on the cost of energy<br>• Impact of the project on foreign direct investment | • Impact on Foreign direct investment: The projects under this programme of activities will employ renewable energy technologies such as wind, solar, hydro and geothermal in order to generate electricity that will result in reduction of CO2 emissions resulting in tradable certified emission reductions. These are expected to attract foreign direct investment and so aid the country to meet its foreign exchange requirements. In most cases, projects will increase the foreign direct investment in South Africa as the equity partners may be in some cases, foreign companies willing to invest in South Africa.<br>• Impact on existing economic activity in the area: At a local level, projects under this programme of activities will improve the existing economic activities especially during construction, as they will require accommodation and catering for the construction workers.<br>• Impact on the cost of energy: Such projects are also expected to result in the stabilisation of the cost of electricity on the longer term since they will result in an increase in the electricity capacity of the South African grid system. |

| Indicators in Support of the Project Approval Criteria | | | |
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| **Category** | | **Indicator** | **Comment** |
| | Appropriate technology transfer | • Positive or negative implications for the transfer of technology to South Africa arising from the project<br>• Impacts of the project on local skills development<br>• Demonstration and replication potential of the project | • Transfer of technology and project replication potential: The project is expected to result in transfer of environmentally safe and sound technology to South Africa through the introduction of such technologies such as solar, wind, hydro and geothermal energy. Currently coal-powered plants dominate the South African grid system with very little presence of renewable energy power plants. The implementation of this PoA will result in the much needed technology transfer and improvement of skill in South Africa on the development, construction, operation and maintenance of such power plants that can be replicable for similar projects. Since the project is a programme, there is a high chance that the CPAs within the programme will be replicable in various parts of South Africa.<br>• Impacts on local skills development: The EIA report of the Greefspan 10MW Solar PV Project, the first CPA in the this PoA indicates that the project is expected to result to creation of job opportunities during the construction phase of the project that would improve the lives and livelihoods of individual families and lead to the development of skills. The EMP also provides mitigation measures to ensure that local labor is employed as far as possible and that the local labor capabilities are expanded as much as possible.<br>• Demonstration and replication potential: It is expected that the implementation of these renewable energy projects will facilitate the future replication of those projects in the South Africa and in the neighboring countries, as once the skills and expertise is built in South Africa, it will be easier for other projects to come. |

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| **Category** | **Indicator** | **Comment** |

| Indicators in Support of the Project Approval Criteria | | | |
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| **Category** | | **Indicator** | **Comment** |
| **Social** | Alignment with national provincial and local development priorities | • How the project is aligned with provincial and national government objectives<br>• How the project is aligned with local developmental objectives<br>• Impact of the project on the provision of, or access to, basic services to the area<br>• Impact of the project on the relocation of communities if applicable<br>• Contribution of the project to a any specific sectoral objectives (for example, renewable energy targets) | • Alignment with provincial and government objectives and contribution to renewable energy targets: The Program of Activities will facilitate the implementation of grid connected renewable energy technologies such as wind, geothermal, hydro and solar. This is in line with the national policy goal in South Africa to increase the capacity of wind, hydro and solar PV technologies in the grid by 10.3%, 5.7% and 9.4% respectively.[1]<br>• Impact on provision of basic services to the area: The project activities under the programme will result to an increase in the electricity capacity in South Africa resulting in better access to electric energy. AE-AMD has also set up an educational trust fund that will:<br>1. Provide scholarships to school leavers in the Northern Cape Province who wish to study engineering, science or maths at tertiary level;<br>2. Subsidise science and maths teachers' salaries at schools in the Northern Cape Province so as to enable those schools to attract good and well-qualified teachers;<br>3. Subsidise the purchase of laboratory equipment and mathematical teaching aids in schools in the Northern Cape Province; and<br>4. Provide support for students from the Northern Cape Province by way of bursaries or scholarships for mathematics, engineering or scientific education at a tertiary institution.<br>In this way the project will help in the provision of access to education in the area.<br>• Impact on relocation: For Greefspan, there is no impact on relocation as no relocation is necessary.<br>• Contribution of the project to renewable energy targets: As indicated above, the Program of Activities will facilitate the implementation of grid connected renewable energy technologies such as wind, geothermal, hydro and solar. This is in line with the national policy goal in South Africa to increase the capacity of wind, hydro and solar PV technologies in the grid by 10.3%, 5.7% and 9.4% respectively.. |

[1] Integrated Resource Plan for Electricity 2010-2030, Department of Energy, Electricity Regulation Act No.4 of 2006, 6 May 2006

| Indicators in Support of the Project Approval Criteria | | | |
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| **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)<br>• Impact of the project on community social structures<br>• Impact of the project on social heritage<br>• Impact of the project on the provision of social amenities to the community in which the project is situated<br>• Contribution of the project to the development of previously underdeveloped areas or specially designated development nodes | • Impact on employment levels: Individual CPAs in the PoA will have specific impacts in terms of job creation. The 10 MW Greefspan Solar PV project reports in its EIA report that a number of jobs will be created mostly in the project construction phase that may take approximately 9 months. This is also indicated as an annex in the implementation agreement between the project owner and the Department of Energy and mentioned in the NERSA generating license. According to these documents, project will create an estimated 169 job opportunities during its contraction phase and 7 job opportunities during the 20-year operations phase. The project owner also commits to have 80% of the employees employed for the purpose of the project to be RSA based employees who are citizens, 50% of the same will be black citizens, 30% of the same will be skilled employees who are black citizens while 25% of the same will be from the local communities.<br>• Impact on community social structures: as explained before, Greefspan is implementing an educational trust that will help to strengthen social structures in the community.<br>• Impact on provision of amenities: As there is no local community directly living in the project site or around it, there is no impact on the social amenities.<br>• Impact to the development of previously underdeveloped areas: No impact |

| Indicators in Support of the Project Approval Criteria | | | |
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| **Category** | | **Indicator** | **Comment** |
| General | General Project Acceptability | • Are the distribution of project benefits deemed to be reasonable and fair? | Yes, the distribution of the project benefits in terms of the CDM is fair and reasonable because while the project owner takes a great financial risk in investing in the implementation of such a programme, there are a myriad of benefits (economic, social and environmental) as result of the project implementation on a national level as well as project area level. These have been described above. Specific CPA's are expected to directly benefit the local community through such initiatives as trust funds that result in the development of the area. For the Greefspan project, AE-AMD has set up an educational trust fund that will benefit the local community and therefore the CDM benefits will be shared with the community. The project has also committed itself to provide approximately 1.5% of its revenue towards social economic development initiatives. These have stipulated as an annex in the implementation agreement between the project owner and the Department of Energy |

## Part D: Finance

| Project Costs | |
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| **Development Costs (R's )** | Although the CME has incurred costs as a result of the PoA development, specific costs for each CPA will vary from project to project and so cannot be accurately provided here.<br><br>Furthermore the project additionality approach does not involve an investment analysis therefore exact figures are not available. |
| **Installed Costs (R's)** | As described above |
| **Other Costs (R's)** | As described above |
| **Total Project Costs (R's)** | As described above |
| **Sources of Finance** | |
| **Equity** | This will be CPA dependent as each CPA may have different funding requirements |
| **Debt** (long term) | CPA dependent |
| **Debt** (short term) | CPA dependent |
| **Amount not identified (R's)** | CPA dependent |
| **Total CDM Contribution sought** | CPA dependent but is necessary to assist in raising capital as deemed necessary per CPA |
| **Expected Price of CER** in case of a contract to purchase for:<br>A period of 7 years<br>A period of 10 years<br>A period of 14 years (2x7 years) | The crediting period per CPA is defined as 7 years however the pricing is subject to negotiation between the CPA and the CME. Current pricing is 3.57 Euro but it is anticipated that 6-8 Euros is achievable in the short to medium term. |
| Indicate the **projected Internal Rate of Return** for the project with and without CER revenues. | Each CPA is led by their internal requirements however an industry related rate of return is subject to the prevailing market conditions. However the Greefspan 10 MW Solar PV Project is using automatic additionality as described above . |
| **Constraints on tradability of carbon credits** | None, but subject to legislation, current and future |
| **Preliminary discussions with potential purchasers** | The project was selected as Preferred Bidder by the Department of Energy in the first bid submission thus an offtake agreement has been signed. The CPA has an ERPA with the CME for the anticipated CER's generated |

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