**CLEAN DEVELOPMENT MECHANISM**
**PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM**
**(CDM-PoA-DD) Version 01**

## CONTENTS



**Annexes**



NOTE:

This form is for the submission of a CDM PoA whose CPAs apply a large scale approved methodology.

At the time of requesting registration this form must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case).

## SECTION A. General description of programme of activities (PoA)

### A.1 Title of the programme of activities:

CDM Africa Wind and Solar Programme of Activities for South Africa

**Table 1: PoA DD version History**

| Date and Version Number | Activity |
|---|---|
| 17 October 2011, Version 01 | Submitted for validation |
| 4 February 2012, Version 02 | Review and respond to validation report |
| 16 March 2012, Version 03 | Review and respond to validation report |

### A.2. Description of the programme of activities:

**BACKGROUND**

South Africa has approximately 45,000 MW of installed capacity for power generation, out of which the contribution of renewable energy sources is negligible. As of October 2011 the installed capacity for grid connected power generation from solar is 0% and for wind is less than 0.023%[1].This is typically due to high costs associated with implementing the renewable energy power plants in South Africa and the fact that the country has traditionally had a state sponsored utility monopolising the electricity supply industry[2].

The coordinating & managing entity "PoA Africa Wind/Solar (Pty) Ltd has initiated the proposed "CDM Africa Wind and Solar Programme of Activities for South Africa" to promote the development and implementation of wind and solar projects, with the objective to contribution towards increased generation of renewable energy in South Africa.

**1. GENERAL OPERATING AND IMPLEMENTING FRAMEWORK OF POA**

The programme of activities (hereafter referred to as "the PoA") is a programme for the installation of wind and solar projects generating electricity into the national grid across South Africa. Both PV and solar thermal technologies are included in the PoA. In the case of solar thermal applications, only power plants that do not use fossil fuels as a backup energy source to generate electricity into the grid are allowed to participate under the PoA. Each CDM programme activity (CPA) will be implemented in geographically distinct area within South Africa. The PoA and the inclusion of each CPA will be managed by a managing/coordinating entity (CME), PoA Africa Wind/Solar (Pty) Ltd.

The PoA would cover grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant) and/or (b) involve a capacity addition.

[1] http://en.wikipedia.org/wiki/List_of_power_stations_in_South_Africa;

[2] Eskom generates approximately 95% of the electricity in South Africa. (http://www.eskom.co.za/c/40/company-information.)

The following renewable energy technologies can be implemented under the PoA:

- Wind Power
- Solar Power (PV and solar thermal only if the solar thermal power plant does not use fossil fuels to generate electricity into the grid)

## 2. POLICY/MEASURE OR STATED GOAL OF THE POA

The objective of the CDM Africa Wind and Solar Programme of Activities for South Africa is to develop a multi-track platform for overcoming regulatory, institutional, financial and structural hurdles for the roll-out of wind and solar power in South Africa by providing access to carbon finance. Thus, whether projects are pursued under a government procurement programme, a Renewable Energy Feed-in Tariff Scheme, under a private Power Purchase Agreement (PPA) with wheeling electricity through the grid or for own use to displace grid electricity, the CDM Africa Wind and Solar Programme of Activities for South Africa is intended to provide a platform that can leverage carbon finance to overcome the barriers to implementation that renewable energy power plants face in South Africa.

In spite of abundant resources[3], renewable energy contributes only a negligible share (less than 0.23% for wind and 0% for solar as of October 2011) to South Africa's installed power capacity[4]. Primary reason for the current situation is the financial viability of the renewable energy as compared to conventional non-renewable energy. NERSA (National Energy Regulator of South Africa) decided in 2009 that ZAR1.25/kWh is required for wind feasibility and in excess of ZAR2,00 for solar. This proposed Renewable Energy Feed-in Tariff (REFIT) scheme was abandoned but the decision shows the price issues preventing the deployment of renewables. The average (grid) electricity price is presently 53c/kWh - still much lower than the price renewables require for feasibility. The low penetration of solar and wind is due to the high cost of renewable energy vis-à-vis renewables and the dominance of the state utility Eskom[5].

[3] For wind see http://academic.sun.ac.za/crses/pdfs/Hagemann.pdf page 20 where a PhD graduate projects that significant percentages of South Africa's electricity needs can be met from wind power, with 35% as the mid-range estimate. See also http://www.iea.org/work/2007/neet/oelsner.pdf page 9 and http://blog.sari.org.za/about/the-sari-approach/. For more solar specific information see http://academic.sun.ac.za/crses/UNEP/Additional%20-%20TP%20Fluri%20The%20potential%20o%20fconcentrating%20solar%20power%20in%20South%20Africa.pdf (abstract sufficient) and http://www.totalsolarenergy.co.uk/south-africa-solar-energy.html

[4] http://news.za.msn.com/economic/article.aspx?cp-documentid=153362721; http://www.cef.org.za/index.php?option=com_content&view=article&id=41:minister-switches-on-the-darling-wind-farm&catid=7:news&Itemid=24

[5] http://www.dpe.gov.za/news-3

See http://www.fin24.com/Opinion/Columnists/Jan-de-Lange/Looming-menace-20110830)

http://www.eskom.co.za/c/article/623/home/ and click on "non-local authority rates (applicable 1 April 2011 to 31 March 2012)

To reach the stated goal, the CME will raise awareness among developers on opportunities for generating CDM revenues and provide standardized and streamlined access to CDM services for renewable energy projects in South Africa. The CME will ensure that CPA's are eligible before joining, coordinate the inclusion of the CPA's in the PoA, conduct the inclusion to the PoA of the CPA's, provide monitoring and verification services to all CPAs, and support the effective commercialization of CERs. Over time, additional services may be added to support the effective development of the renewable energy sector across the host country.

In this way, the renewable energy PoA will promote the development of renewable energy wind and solar projects and facilitate the mitigation of greenhouse gas (GHG) emissions through displacement of electricity generated by grid connected power plants that contain a majority of fossil-fuel fired installations.

The contribution of the PoA to sustainable development is assessed as follows by using the sustainable development criteria of the South African DNA under the Ministry of Energy:

Social benefits:

- Temporary and permanent jobs will be created in the construction and operation phases of the CPA projects;
- There will be an excellent opportunity to improve skills levels as the need for local labour to operate and maintain the installations grows[6].

Environmental benefits:

- The PoA encourages the development of renewable energy plants that replace non-renewable energy (typically energy generated from fossil fuels) and reduce emissions of pollutants (per unit of energy generated) including GHG emissions.
- In contrast to most other sources of power, technologies included in this PoA, (wind power and solar power), do not produce solid waste; which addresses the problem of solid waste disposal encountered by most other sources of power.
- When used to generate electricity, renewable energy contributes to natural resource conservation, for instance coal.

Economic benefits:

- The PoA increases employment opportunities in the area where each CPA is located, leading to a general increase in local-community income[7].
- The PoA/CPA enhances the local investment environment and improves the local economy.
- The PoA diversifies sources of electricity generation that are necessary to meet a growing demand for energy and facilitates the transition away from fossil fuel electricity generation.

[6] See "Options for the Establishment of a South African Wind Energy Centre (SAWEC)" by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Centre for Renewable and Sustainable Energy Studies (CRSES), Stellenbosch University, pages 57 – 70 (will be supplied to validators)

[7] See footnote 6 above

## 3. CONFIRMATION THAT THE PROPOSED POA IS A VOLUNTARY ACTION BY THE COORDINATING/MANAGING ENTITY.

The proposed PoA is a voluntary action by the private initiative PoA Africa Wind/Solar (Pty) Ltd.

## 4. PRIOR CONSIDERATION

A project idea note (PIN) for this PoA together with PIN's for several CPA's was submitted to the South African Designated Authority on 12 October 2011. No projects have been implemented under this programme and installations will only commence at the earliest once the programme has been published for global stakeholder comment - in line with the decisions of EB47.

## A.3. Coordinating/managing entity and participants of POA:

**Coordinating or managing entity of PoA as the entity which communicates with the Board**

The Coordinating or Managing entity of the PoA will be PoA Africa Wind/ Solar (Pty) Ltd. The contact details are as listed in Annex 1.

**Project participants under the POA**

| Name of Party involved (*) ((host) indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| Host Party South Africa | CDM Africa Climate Solutions (Pty) Ltd | No |
| Host Party South Africa | PoA Africa Wind/Solar (Pty) Ltd | No |

## A.4. Technical description of the programme of activities:

### A.4.1. Location of the programme of activities:

South Africa

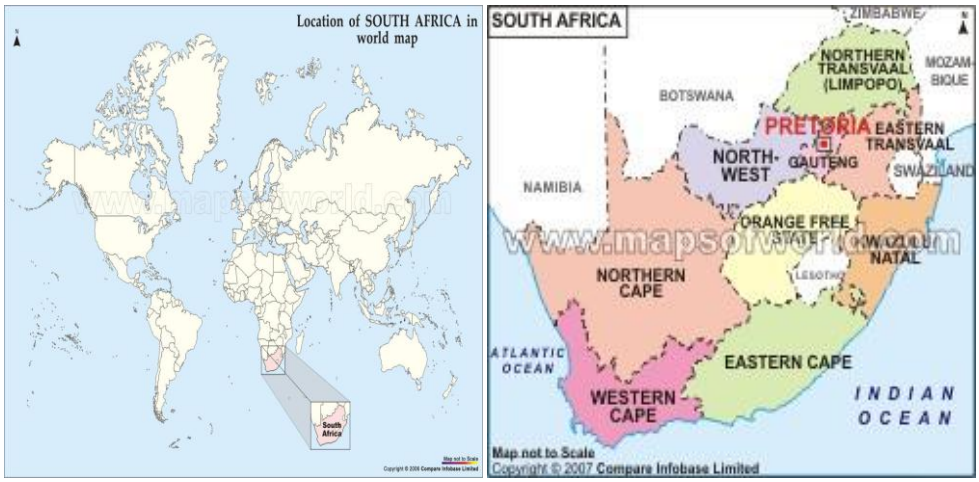
#### A.4.1.1. Host Party(ies):

South Africa

### A.4.1.2. Physical/ Geographical boundary:

The political boundary of South Africa is chosen as the country/ geographical boundary of the PoA. The CPAs that will be included under the PoA will be in compliance with all applicable national and / or sectoral policies and regulations.

South Africa in global context and country map




Sources: http://www.mapsofworld.com/south-africa/southafrica-location-map.html;
http://www.mapsofworld.com/south-africa/

### A.4.2. Description of a typical CDM programme activity (CPA):

A CPA consists of either:

(1) a **newly-built (greenfields)** grid-connected Solar power plant (PV or solar thermal without the use of fossil fuel as backup energy source) or Wind Farm; or

(2) grid-connected Solar (PV or solar thermal without the use of fossil fuel as backup energy source) or Wind Farm **capacity addition** to an existing grid-connected solar or wind power plant.

While some of the CPA's may not exceed the small-scale limit all will be treated as large scale projects under the same methodology ACM0002.

The PoA would cover grid-connected renewable power generation project activities that involve a capacity addition as a separate and distinct CPA.

The greenhouse gas emissions that will be displaced are South African grid emissions, $CO_2$. The CPAs will not utilise any fossil fuels to generate electricity into the grid and therefore no project emissions are anticipated. No leakage is anticipated.

**A.4.2.1. Technology or measures to be employed by the CPA:**

The CPA's will utilise wind turbines or solar panels as well as the appropriate materials and technology for balance of plant and electrical connections. In the case of solar power plants, both PV and solar thermal installations are included in the PoA, but in the case of solar thermal installations, no co-firing with fossil fuel sources will be used as backup energy source to generate electricity into the grid.

For Wind Farms:

A description of the equipment(s) and systems that will be installed within the project activity will be provided in the CPA-PDD. For wind farms, it typically includes the following:

- Wind turbines;
- Concrete foundations to support the turbine towers;
- Electrical distribution cabling between the turbines;
- Substations on the site in an appropriate position to receive generated power via underground distribution cabling from each wind turbine;
- Overhead power lines;
- Roads to the site from the main road/s within the area;

For Solar PV plants:

A description of the equipment(s) and systems that will be installed within the project activity will be provided in the CPA-PDD. It typically includes the following:

- Solar receptors in the form of solar photovoltaic (PV) panels;
- Metal frames on which panels are mounted
- The frames are anchored in concrete foundations
- The panels are built in an array with cabling linking the PV panels to inverters
- An Electricity Collector -
- Electrical Infrastructure;
- Substations;
- Internal Roads;
- Fencing;

For Solar Thermal (CSP) plants

- Solar receptors in the form of parabolic trough mounted on a metal frame or a power tower which is a vertical structure with focussed mirrors;
- Electrical Infrastructure including substations;
- A water supply system
- The "power block" including a steam turbine and possibly including infrastructure aimed at thermal heat storing
- Roads;
- Fencing;
- A generation turbine

Monitoring Equipment
The main data for calculating emission reductions of the project activity is $EG_{facility,y}$ (Net electricity supplied to grid by the wind power plant or solar power plant in year y) monitored by electricity meters.

Technology Transfer
The proposed PoA will contribute to technology transfer to the host country South Africa, since it utilises wind/solar power technology developed in Annex 1 countries. The country where the technology originates from is provided in the CPA-PDD.

**A.4.2.2. Eligibility criteria for inclusion of a CPA in the PoA:**

The criteria developed in Table 2 are based on the requirements in the "Standard For The Development Of Eligibility Criteria For The Inclusion Of A Project Activity As A CPA Under The PoA", Version 01.0, EB63 Annex 3. Table 6 in Section E.2. describes the applicability criteria of the methodology ACM0002 and the "**Tool to calculate the emission factor for an electricity system".**

The criteria for demonstrating additionality of a CPA shall be described in section E.5.

The CPA will be assessed against this list of criteria in Table 2 and Table 6 by the CME at the time when the CPA applies to enroll in the POA. Some additional eligibility criteria to be imposed by the CME are contained in sections g(1) – g(4) below.

**Table 2: Eligibility Criteria for each CPA**

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| (a) | The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA; | The CPA must be grid connected to the South African national electricity grid and fall within the boundaries of the Republic of South Africa as they may exist at the time of CPA inclusion. | CPA operator: Provide the GPS coordinates of the proposed CPA site as Addendum A to the PoA application submitted to the CME.<br><br>CME: Confirms that the GPS coordinates fall within the boundaries of South Africa. |
| (b) | Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo); | Each CPA will follow the procedures established by the CME and described in Section A.4.4.1 to avoid double counting and comply therewith.<br><br>Each CPA shall be uniquely identified and defined in an unambiguous manner by amongst other aspects providing geographic information (GPS coordinates), the installed capacity of the plant and the exact start date/ end date of the crediting period. | CPA operator:<br><br>1. Provide the GPS coordinates of the proposed CPA site as Addendum A to the PoA application submitted to the CME.<br>2. Confirms that as far as they are aware, the CPA is not part of another PoA or a CDM individual project activity.<br>3. Confirms the installed capacity for the CPA.<br><br>CME:<br><br>1. Investigate whether there are other CPAs in the same region in South Africa as the proposed CPA.<br>2. Records the installed capacity for each CPA. |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| | | | 3. Ensures that if there is a capacity expansion that it gets recorded as a new CPA and not as part of a previous CPA.<br>4. If there are other CPAs in development in the same region as the proposed CPA, the CME will investigate all other CPAs in the region and confirm that the proposed CPA is not already participating in another PoA or as an individual CDM project activity. |
| (c) | The specifications of technology/ measure including the level and type of service, performance specifications including compliance with testing/ certifications; | Solar PV and solar thermal applications are covered if the end product is electricity generated into the grid. For solar thermal plants, only plants that do not use fossil fuels to generate electricity into the grid can be included into the PoA.<br><br>Each CPA will demonstrate that the wind/solar equipment complies with the relevant international or local quality standards, that it produces electricity from wind power or solar irradiation, and that it has been chosen to be appropriate and efficient to the conditions within which it is to be implemented. | CPA operator: When submitting the PDD, provide the relevant equipment certificate that confirms that the equipment complies with an acceptable international or South African standard.<br><br>CME: Investigate the documentation provided by the CPA operator and confirms that the certifications for the equipment provided by the CPA operator complies with international or South African standards. |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| | | Each CPA will submit documentation to the CME in this regard and the CME will record and store the information for validation purposes. | |
| (d) | Conditions to check the start date of the CPA through documentary evidence; | Documentary evidence will be provided to demonstrate that expenditures were/are committed relating to the implementation or construction of the project activity. | The CPA operator will provide documentary proof of real action towards the CPA.<br><br>For example, that the deposit was made for the equipment to the CME and the CME will record the start date of the CPA and confirm that a document check has been done.<br><br>CME will record the start date of the CPA and confirm that a document check has been done. |
| (e) | Conditions that ensure compliance with applicability and other requirements of single or multiple methodology/ies applied by CPAs; | Each CPA must meet the criteria for methodology ACM0002 version 12.3.0. No other methodologies will be used. | CPA operator: Complete Table 5 provided in the CPA_DD and provide the relevant evidence (if applicable) to demonstrate that the proposed CPA complies to the criteria.<br><br>CME: Check the information and evidence provided by the CPA operator and confirm that the proposed CPA complies with the eligibility criteria of the relevant version of ACM0002 and the Tools that are applied. |
| | | | |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| (f) | The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality; | The CPA's need to demonstrate additionality in one of the ways described in section E.5.1. | CPA operator: Complete Section B.3 of the CPA DD and provide the relevant evidence (where applicable) to demonstrate that the proposed CPA is additional.<br><br>CME: Check the information and evidence provided by the CPA operator and confirms additionality before submitting the CPA to the DOE for inclusion in the PoA. |
| (g) | The PoA-specific requirements stipulated by the CMEs including any conditions related to undertaking local stakeholder consultations and environmental impact analysis; | All projects will submit a Project Idea Note to the SA DNA as a public consultation mechanism.<br><br>The CME will keep itself apprised of the legal requirements relating to EIAs and renewable energy projects. Projects that require and EIA assessment according to the applieable legislation to EIAs in South Africa as it exists at the time of CPA inclusion will carry out such EIA assessments in the format required by law.<br><br>If the project is exempt from conducting an EIA public participation will still occur through the liaison with the DNA and liaison with at least the CPA project neighbours and local municipality. | CPA operator:<br><br>1. Complete PIN and submit to the SA DNA. Provide a copy of the PIN and confirmation that the SA DNA has received the PIN to the CME.<br>2. Submit the information regarding the EIA status to the CME when the application to participate in the PoA is submitted to the CME.<br><br>CME:<br><br>1. Check the confirmation received by the CPA operator from the SA DNA to confirm that the PIN was submitted. |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| | | Documented evidence will be provided to the CME that confirms that stakeholder participation was conducted that covered the CDM component of the project activity. The CME will check that sufficient opportunity was allowed for stakeholders to communicate concerns and comments regarding the implementation of the project activity under CDM to the CPA operator and that relevant concerns and comments relating to CDM were addressed. The CME will store the documentation.<br><br><u>Additional criteria imposed by CME not pertaining to EIA or public participation:</u><br><br>1) The proposed Project activity has to be voluntary initiative by the CPA operator and not implementing any mandatory policy or regulation.<br><br>2) Each CPA must be approved by the CME prior to its incorporation into the PoA. | 2. The CME will keep itself appraised with the legal requirements relating to EIAs and renewable energy projects in South Africa.<br>3. Check the EIA information submitted by the CPA operator and confirm that the relevant public consultation has been conducted according to the prevailing law.<br><br>CPA operator: Confirm that the CPA is a voluntary initiative and not the implementation of a mandatory policy or regulation and submit a declaration in this regard when submitting an application form to the CME to participate in the PoA.<br><br>CME: File the declaration submitted by the CPA operator as evidence in the database. |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| | | Before a CPA can be included in the POA, a letter of no objection has to be issued by the South African DNA or the entity responsible to evaluate the Sustainable Development criteria for the projects.<br><br>3) Each CPA should have a contract of services and rights with and vis-a-vis the CME that governs the CPA's participation in the PoA, and complies with the code of conduct of the CME.<br><br>4) Each CPA has to be in line with national laws and regulations in force at the time of inclusion of the CPA into the PoA. | |
| (h) | Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation); | The target group is prospective wind and solar project developers in South Africa.<br><br>There are no specific distribution mechanisms. This applicability criteria will not be reflected in Table 4: "Eligibility Criteria for each CPA" in the CPA-DD, because it is not applicable to the project activities. | No action required by the CPA operator or the CME. |
| | | | |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| (i) | Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys; | No sampling will be done within any specific CPA and no sampling of CPAs within the PoA will be done. Each CPA that wants to have CERs issued will undergo verification. It may happen that a CPA operator selects to only conduct verification every 2nd year for cost reasons, and in this case the verification will cover a 2 year monitoring period for this CPA and issuance will occur every 2nd year for the CPA after successful verification. | No support documentation needed. |
| (j) | Where applicable, the conditions that ensure that CPA in aggregate meets the small-scale or micro-scale threshold criteria (please refer to the latest approved version of the "Guidelines for demonstrating additionality of microscale project activities" and the latest approved version of the "General Guidelines to SSC CDM methodologies" and remain within those thresholds throughout the crediting period of the CPA; | Given that ACM0002 will be used for all projects this requirement does not apply.<br><br>This applicability criteria will not be reflected in Table 4: "Eligibility Criteria for each CPA" in the CPA-DD, because it is not applicable to the project activities. | |
| (k) | Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories (please refer to the latest approved version of the "Guidelines on assessment of debundling for SSC project activities"); | Given that ACM 0002 will be used for all projects this requirement does not apply.<br><br>This applicability criteria will not be reflected in Table 4: "Eligibility Criteria for each CPA" in the CPA-DD, because it is not applicable to the | |

| | Criteria as per "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA", Version 01.0, EB63 Annex 3 plus additional criteria to be imposed by the CME | Demonstration of how PoA complies or imposes additional criteria | Support documentation/evidence provided by the CPA/CME to demonstrate and confirm that the CPA is eligible to be incorporated in the PoA |
|---|---|---|---|
| | | project activities. | |
| (l) | Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance. | The CME will investigate the facts in each CPA and in each CPA PDD include a confirmation that no Official Development Aid will be involved or diverted. | CPA Operator: Confirm whether public funding is used in the CPA. If public funding is used, the CPA operator has to provide evidence and declare that the public funding is not a diversion of ODA.<br><br>CME: If public funding is used in the CPA, the CME will check and confirm that the public funding is not a diversion of ODA. The CME will file the document evidence for example the declaration provided by the CPA operator. |
| (m) | Applicability vis a vis simple operating margin: CPAs can only join the PoA as long as the simple operating margin is applicable | The CME will ensure at the time that the CPA joins that the simple operating margin is still applicable | No supporting documents required - EB documents will direct the discussion |

The CME will ensure that all CPAs under its PoA are neither registered as an individual CDM project activity nor included in another registered PoA, and that the CPA is subscribed to the PoA.

According the "STANDARD FOR THE DEVELOPMENT OF ELIGIBILITY CRITERIA FOR THE INCLUSION OF A PROJECT ACTIVITY AS A CPA UNDER THE POA", (Version 01.0, EB63 Annex 3) if version 12.3.0 of ACM0002 applied by the PoA is revised or replaced, subsequent to being placed on hold, PoA Africa Wind/Solar (Pty) Ltd as the CME shall update the eligibility criteria to the requirements of the revised or new methodology with immediate effect and include them in a new version of the PoA DD (e.g. version 1.1) and new generic CDM-CPA-DD validated by a DOE, and shall submit it to the Board for approval.

**A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):**

The following shall be demonstrated here:

(i) The proposed PoA is a voluntary coordinated action;
(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;
(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

The information presented here shall constitute the demonstration of additionality of the PoA as a whole. (Additionality will be demonstrated for each CPA on CPA level).

As the proposed PoA is a voluntary and coordinated action, the assessment and demonstration of additionality for the PoA as a whole will address points (i) and (ii) above.

**Requirement (i): Voluntary Coordinated Action**

At present disparate developers in South Africa are developing wind and solar power plant projects in isolation of one another in the hope of securing all regulatory approvals and also securing a Power Purchase Agreement ("PPA") that will make the projects bankable. In each case carbon finance would enhance the feasibility of the projects. The carbon finance (CDM) approval process however is expensive and time consuming and developers are in the very difficult position of motivating the spend on CDM not knowing that they will secure a PPA even if the CDM succeeds.

This PoA is a voluntary, coordinated action aimed at speeding up, simplifying and lowering the cost for developers of getting carbon finance (CDM) approval so that they can be assisted to meet reasonable financial return criteria and make projects bankable.

From a country perspective the aim of the PoA is to ensure that international carbon finance supplements domestic funding for Wind and Solar Power plant projects, so assisting to bridge the gap between least cost fossil fuel energy and renewable energy from wind and solar sources.

There are no mandatory laws or regulations in the host country stipulating to implement a Renewable Energy Plant or development of a PoA. Likewise, no obligation exists for private entities to utilize or develop renewable energy projects. The proposed PoA can be, therefore, regarded as a voluntary coordinated action.

**Requirement (ii): It would not be implemented in the absence of the PoA**

According to paragraph 6 in the published "Standard For Demonstration Of Additionality Of GHG Emission Reductions Achieved By A Programme Of Activities, Version 01.0, EB 63, the additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CDM Project Activity (CPA) would occur.

According to paragraph 9 of the guideline, PoAs that will include one or more large-scale projects as CPA shall include eligibility criteria derived from all the relevant requirements contained in the additionality section of the large-scale methodology. Therefore, for each CPA, additionality will be demonstrated as required by the applicable version of ACM0002 and the relevant Tools that provide guidance. If each CPA can demonstrate additionality at CPA level in this manner using the relevant tools then it can be said that none of the CPA's under the PoA would occur in the absence of CDM.

**Requirement (iii) and (iv): Mandatory policy/regulation**

The PoA is not implementing a mandatory policy/regulation and these requirements are thus not applicable.

## A.4.4. Operational, management and monitoring plan for the programme of activities:

### A.4.4.1. Operational and management plan:

Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including:

(i) a record keeping system for each CPA under the PoA,
(ii) a system/procedure to avoid double counting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA,
(iii) the provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA;

The proposed PoA involves a range of operational activities in order to implement and manage each CPA by the coordinating entity CME and CPA implementer within the PoA.

The roles and responsibilities will be as follows:

**Table 3: High level Responsibilities for the CME and CPA operator**

| CME | CPA operator |
|---|---|
| Ensure that all eligibility criteria of each CPA application are met before submitting the PoA for validation. | Implement renewable energy plant project activity (Manage the construction, daily operation, and maintenance of power plant) |
| Maintain existing relationship with the project | Monitoring and recording the plant operation data. |

| CME | CPA operator |
|---|---|
| implementers (e.g. conduct training for data measurements) | |
| Collect monitoring data. | Maintenance of equipment |
| Prepare monitoring reports for emission reduction verification. | |
| Support in validation, registration and verification of the CPA's | |

In addition to the above management tasks, the CME will implement the following operational elements to ensure proper management and oversight of the proposed PoA.

(i) A record keeping system for each CPA under the PoA

In order to unambiguously identify the renewable energy plant participating in the PoA, a serial numbering system will be implemented that uniquely identify each power plant through numbers and letter for the CPA and the power facility. The numbering system will indicate each distinct Wind Farm with the starting letter W and each solar farm with a S. This serial numbering system will be used to record baseline and monitoring data on a continuous basis. In this way, the CME entity will be able to track the emission reduction of each power plant over the full duration of the crediting period.

In summary, the CME will record and document CPA detail in the CME database as follows:

For wind:

**Table 4: Information that will be recorded for Wind CPAs**

| |
|---|
| CPA number |
| CPA operator name, address |
| Type of equipment |
| Turbine make |
| Turbine model |
| Turbine rated capacity |
| GPS coordinates of CPA |
| City/Town/village |
| Province |
| Country |
| Maximum capacity that can be implemented on the site according to environmental approvals |
| Actual CPA installed capacity (MW) |
| Commissioning date |
| Starting date of the crediting period |
| The verification status (number of verification and associated monitoring period) |

For Solar PV:

**Table 5(a): Information that will be recorded for Solar PV CPAs**

| |
|---|
| CPA number |
| CPA operator name, address |
| Type of solar PV equipment |
| Solar PV equipment make |
| Solar PV equipment model |
| Solar PV equipment rated capacity |
| GPS coordinates of CPA |
| City/Town/village |
| Province |
| Country |
| Maximum capacity according to environmental approvals |
| Actual CPA installed capacity (MW) |
| Commissioning date |
| Starting date of the crediting period |
| The verification status (number of verification and associated monitoring period) |

For Solar Thermal:

**Table 5(b): Information that will be recorded for Solar Thermal (CSP) CPAs**

| |
|---|
| CPA number |
| CPA operator name, address |
| Type of equipment |
| Solar thermal equipment make |
| Solar thermal equipment model |
| Solar thermal equipment rated capacity |
| GPS coordinates of CPA |
| City/Town/village |
| Province |
| Country |
| Maximum capacity according to environmental approvals |
| Actual CPA installed capacity (MW) |
| Commissioning date |
| Starting date of the crediting period |
| The verification status (number of verification and associated monitoring period) |

The CME will be responsible for the management of records and data associated with each CPA. The database will be updated manually/electronically using the data supplied by the participating power plants. It will form the basis for the verification of CPAs and be available for inspection by the DOE at any point in time.

(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA.

The database described above will be used to perform a double accounting check. Every new CPA will be compared to the already existing database and the list of project activities that are under validation or registered at the UNFCCC. Moreover as shown below, the project implementers will be made aware of the double accounting principle and will certify that the proposed CPA is not registered under the Clean Development Mechanism of the UNFCCC or any voluntary scheme for availing GHG emission reduction benefits. Should such a case occur then the coordinating entity will not proceed with inclusion of the corresponding CPA in the proposed PoA.

*Procedure to Avoid Double Counting*

Given that each CPA included in the PoA will be identified by geographical location and that the installed capacity of each CPA will be recorded, it is possible to identify CPAs or CDM project activities operating in the same area. The geographical boundary of each CPA is determined by the location of the wind/solar power plant. The address or GPS coordinates for each CPA, will be collected and logged in a database managed by the CME. The CME will conduct a check to establish if any other CPAs or PoAs are implemented in the geographic area where the new CPA operator is aiming to implement a project activity.

Prior to registering a new SSC-CPA within the proposed PoA, the CME will conduct a search in the CDM project database to establish whether a CDM project activity or CPA of another PoA implementing wind/solar technologies has already been registered in the same geographic area. This search will cover registered project activities, project activities requesting registration, project activities under review and project activities for which either a review or corrections have been requested.

The list of wind/solar power plants that are implemented in the POA cannot contain any duplicate entries. This duplication rule applies *within* each CPA (i.e. a wind/solar power plant cannot participate more than once during each CPA), and *between* CPAs (i.e. one wind/solar power plant cannot participate in more than one CPA).

If other CPAs or another PoA is under implementation in the same geographic area where the new CPA is aiming to implement the rollout of wind/solar power plants, the CME will liaise with the managing entity of the other PoA to assess and check that the wind/solar power plants are not logged under more than one CPA or PoA. Because the owner, location, GPS coordinates and installed capacity for each wind/solar power plant are logged in a database, a database search to highlight any double entries of the same wind/solar power plant is simple.

In the event of a capacity expansion the same procedure will be followed. In such a case the search will show another CPA with the same GPS coordinates. A distinct CPA will thus be added to the PoA to represent only the added capacity while the original installed capacity will continue to be represented by the original CPA. In this manner double counting will be avoided during capacity expansions.

(iii) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;

To ensure that the CPA operator is aware of and have agreed that their activity is being ubscribed to the PoA, the CPA operator shall enter into a contractual arrangement with the coordinating entity including respective provisions that:

- The CPA has not been and will not be registered as a single CDM project activity or as a CPA under another PoA.
- The project implementer is aware that the CPA will be subscribed to the present PoA.
- The project implementer waives its rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC or any voluntary scheme to the managing entity of the PoA and accepts that these rights will arise in the name of the CME.

**A.4.4.2. Monitoring plan:**

The CPA DD contains a monitoring protocol for each CPA under Section B6 and Annex 4 (Monitoring information).

The monitoring plan for parameters included in section E.7.1 will be implemented for each CPA with assistance from the CME as follows:

- The CPA operator will implement its CPA and monitor and record all parameters included in section E.7.1.
- The CME will provide guidance to the CPA owner on what metering is required for the PoA purposes and which data parameters should be collected in regards to emission reductions calculations.
- The CPA owners will provide metering information included in section E.7.1 to the CME, either directly into a database provided by the CME or if the information is provided in spreadsheets or by fax, the information will be entered into the database by the CME.

The CME will document and store all parameters included in section E.7.1 provided by CPA owners in an electronic database, while primary data will be stored by the CPA operator.

The PoA opts not to sample CPAs for verification purposes. Each CPA that will claim CERs will be verified.

**A.4.5. Public funding of the programme of activities:**

No public funding has been used or will be used in the financing of the establishment of the PoA framework. Each CPA will provide information regarding public funding of the specific CPA and if public funding is applied to finance a specific CPA, the CPA operator will confirm that public funding is not a diversion of ODA.

## SECTION B. Duration of the programme of activities

### B.1. Starting date of the programme of activities:

17 October 2011

### B.2. Length of the programme of activities:

28 years 0 months

### C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis is done at PoA level ☐
2. Environmental Analysis is done at CPA level X☐

Projects (CPA's) are typically unique in their impact on the environment. Moreover, the mere existence of the PoA has no impact on the environment of itself. The South African law will require the assessment of environmental impact by CPA's in any event through the provisions of the National Environment Management Act and related legislation and regulations. For these reasons it is submitted environmental assessment should be done at CPA level.

### C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

N/a

### C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

As stated above, each CPA will be required by South African law to assess environmental impact.

## SECTION D. Stakeholders' comments

### D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level ☐
2. Local stakeholder consultation is done at CPA level X☐

### D.2. Brief description how comments by local stakeholders have been invited and compiled:

This information will be supplied in the CPA-PDD.

**D.3. Summary of the comments received:**

This information will be supplied in the CPA-PDD.

**D.4. Report on how due account was taken of any comments received:**

This information will be supplied in the CPA-PDD.

## SECTION E. Application of a baseline and monitoring methodology

This section shall demonstrate the application of the baseline and monitoring methodology to a CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a CPA in this PoA (PoA specific CDM-CPA-DD).

**E.1. Title and reference of the approved baseline and monitoring methodology applied to each CPA included in the PoA:**

**Methodology:**

Version 12.3.0 of the Approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

**Tools and Guidelines**

Version 06.0.0 of tool for the demonstration and assessment of additionality
Version 02.2.1 of tool to calculate the emission factor for an electricity system
Version 01 of guidelines for the reporting and validation of plant load factors
For more information regarding the methodology and the tools as well as their consideration by the Executive Board please refer to http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html.

**E.2. Justification of the choice of the methodology and why it is applicable to each CPA:**

The following table provides a list of the Applicability Criteria as described in ACM0002 and provides justifications how and why the CPAs comply with the methodology.

**Table 6: Applicability Assessment against ACM0002 and the "Tool to calculate the emission factor for an electricity system"**

| Applicability Criteria | Description of how the applicability criteria is applied to the PoA |
|---|---|
| This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s). | This project activity is a grid connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant) or involves a capacity addition. |

| Applicability Criteria | Description of how the applicability criteria is applied to the PoA |
|---|---|
| | In this PoA retrofits of existing plants and replacements of existing plants are not allowed. |
| The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; | The proposed project activity is the installation of a new grid connected wind or solar power plant or capacity addition of a wind power plant or solar power plant.<br><br>Retrofits or replacements of a power plant/unit are excluded in this PoA. |
| In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; | The project activity could be the implementation of capacity additions in wind or solar power plants, but the CPA operator shall confirm that the capacity addition will not affect the electricity generation of the existing power plants. |
| In case of hydro power plants, one of the following conditions must apply:<br>○ The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or<br>○ The project activity is implemented in an existing or multiple reservoirs, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 $W/m^2$; or<br>○ The project activity results in new single or multiple reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 $W/m^2$. | The project is not the implementation of a Hydro plant – therefore these applicability criteria do not apply to the proposed project activity. |
| In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 $W/m^2$ after the implementation of the project activity all of the following conditions must apply:<br>• The power density calculated for the entire project activity using equation 5 is greater than 4 $W/m^2$;<br>• All reservoirs and hydro power plants are located at the same river and were designed | The project is not the implementation of a Hydro plant – therefore these applicability criteria do not apply to the proposed project activity. |

| Applicability Criteria | Description of how the applicability criteria is applied to the PoA |
|---|---|
| together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant;<br>• The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;<br>• The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 $W/m^2$, is lower than 15 MW;<br>• The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 $W/m^2$, is less than 10% of the total installed capacity of the project activity from multiple reservoirs. | |
| The methodology is not applicable to the following:<br>• Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;<br>• Biomass fired power plants;<br>• Hydro power plants that result in the creation of a new single reservoir or in the increase in existing single reservoir where the power density of the power plant is less than 4 $W/m^2$. | The proposed project activity is not the switch from a fossil fuel plant to a wind/solar power plant at the site of the project activity. The CPA site in each instance has no power generation facility constructed at the time when the wind/solar power plant will be established.<br><br>The proposed project activity does not involve any biomass fired power plants.<br>Not applicable as the project is not the implementation of a Hydro plant. |
| In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance. | Replacements and retrofits are not included in the scope of the PoA.<br>The baseline scenario for capacity additions are described in the methodology. |
| **Applicability criteria for the "Tool to calculate the emission factor for an electricity system".**<br>This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). | The project activity supplies electricity to a grid. The Tool is applied to determine the CM for calculating the baseline emissions. |
| Under this tool, the emission factor for the project electricity system can be calculated either for grid | The emission factor for the project electricity system will be calculated for grid power |

| Applicability Criteria | Description of how the applicability criteria is applied to the PoA |
|---|---|
| power plants only or, as an option, can include off-grid power plants. In the latter case, the conditions specified in Annex 2 - Procedures related to off-grid power generation should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10% of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10% of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity. | plants only and will exclude off-grid power plants. |
| In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country. | The project electricity system is not located partially in an Annex 1 country. |

## E.3. Description of the sources and gases included in the CPA boundary

As per ACM0002 the spatial extent of the project boundary includes the project site and all the power plants connected physically to the electricity system. The project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints.

According to the methodology ACM0002 a grid-connected wind/solar power project like the proposed CPAs is required to consider only the $CO_2$ emissions from fossil fuels fired power plants in baseline scenario.

**Table 7**

| Source | | Gas | Included ? | Justification / Explanation |
|---|---|---|---|---|
| Baseline | $CO_2$ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the 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 $CH_4$ and $CO_2$ from non-condensable gases contained in geothermal steam | $CO_2$ | No | Not applicable |
| | | $CH_4$ | No | Not applicable |
| | | $N_2O$ | No | Not applicable |
| | $CO_2$ emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants | $CO_2$ | No | Not applicable because only solar thermal plants that do not use fossil fuels to generated electricity into the grid are included in the PoA. |
| | | $CH_4$ | No | Not applicable |
| | | $N_2O$ | No | Not applicable |
| | For hydro power plants, emissions of $CH_4$ from the reservoir | $CO_2$ | No | Not applicable |
| | | $CH_4$ | No | Not applicable |
| | | $N_2O$ | No | Not applicable |

**E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:**

According to the ACM0002, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

If the project activity is a capacity addition to existing grid-connected renewable power plant/unit, the baseline scenario is the following:

In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted ($DATE_{BaselineRetrofit}$). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.

**E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the CPA being included as registered PoA (assessment and demonstration of additionality of CPA):** >>

**E.5.1. Assessment and demonstration of additionality for a typical CPA:**

In the event that the CPA complies with the positive list of project published by the EB63 Annex 24, Attachment A of Appendix B, (Version 08), the project will be assumed additional. The positive list of grid-connected renewable electricity generation technologies that are automatically defined as additional, without further documentation of barriers, include solar technologies (photovoltaic and solar thermal electricity generation) of installed capacity up to 15 MW.

The additionality of a CPA is the demonstration that in the absence of CDM the CPA would not have been implemented. The additionality of the project activity shall be demonstrated and assessed using the "Tool for the demonstration and assessment of additionality, Version 06.0.0" agreed by the Board.

**Demonstration of Additionality per Methodological Tool**

**Step 1: Identify realistic and credible alternative baseline scenarios for power generation**

According to ACM0002, if the project activity is the installation of a new grid-connected renewable power plant (wind or solar), the baseline scenario is the following: 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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

For new grid-connected renewable wind or solar power plants or capacity additions to an existing grid-connected renewable power plant, there is no need to further analyse alternatives to the proposed project activity to assess and demonstrate the baseline scenario, since the methodology ACM0002, prescribes the baseline scenario for the proposed project activity.

If the project activity is a capacity addition to an existing grid-connected renewable power plant/unit, the baseline scenario is the following:

- In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted ($DATE_{BaselineRetrofit}$). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.

The next step is the investment analysis, Step 2.

**Step 2: Investment Analysis**

Sub-step 2a. Determine appropriate analysis method

The analysis will be analyzed through Option III of the additionality tool, i.e. benchmark analysis. This method is applicable because:

- Option I: simple cost analysis, does not apply as the project generates economic returns through the sale of electric power to the grid. Other than CDM related income, the project produces economic benefit through the sale of electricity generated by the project activity.
- Option II: Investment comparison analysis is not used, as there is no realistic alternative for the project (provision of power to the grid) involving investments. In other words, the investment comparison analysis is not applicable to the project because the alternative of the project is "Equivalent electricity service provided by the grid", which is not a single project.
- Option III, benchmark analysis can be transparently demonstrated using financial/economic information for the proposed project activity and compare financial indicators against a relevant industry benchmark hurdle rate.

According to paragraph 19 of Annex 13, EB 6, the benchmark approach is suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest. In the case of this project activity, the baseline is the national grid and is outside of the control of the project developer.

**Conclusion**: Option III is applicable to the CPA as transparent data on the CPA and relevant industry benchmark is available. Hence, the benchmark analysis is applied and the Equity Internal Rate of Return (IRR) is used to assess the financial viability of the project activity.

Sub-step 2b. Option III. Apply benchmark Analysis

Given that the decision to invest is finally made by equity providers the equity IRR will be used as a benchmark in the present PoA.

The following benchmarks can be used:

- Government/official approved benchmark where such benchmarks are used for investment decisions;
- Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds. required return on comparable projects;

The benchmark analysis as described in the additionality tool prescribes that the project returns should be compared to a benchmark value that is based on "standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer".[8]

[8] For example, according to a Report published by the Energy Regulator of South Africa (NERSA) in March 2011, the benchmark real equity IRR of renewable energy projects in South Africa is 17%. Based on the benchmark Equity IRR of 17%, the calculation and comparative analysis of financial indicators for the proposed project are carried out in sub-step 2c.

Sub-step 2c. Calculation and comparison of financial indicators – equity IRR

The CPA operator will calculate the equity IRR, in accordance with the guidance provided in the Tool for the demonstration and assessment of additionality.

The applied benchmark shall be appropriate to the equity IRR calculated[9].

See section E.5.2 below for the data used to inform the calculation by the CME.

**Comparison of benchmark indicator for the proposed CPA**

In accordance with the benchmark analysis, the proposed project is not considered as financially attractive if its financial indicators are lower than the benchmark requirements.

Sub-step 2d. Sensitivity analysis

The purpose of the sensitivity analysis is to examine whether the conclusion regarding the financial viability of the proposed project is sound and tenable with those reasonable variations in the assumptions.

The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be financially attractive.

For the proposed CPA, identify only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues. Use these parameters as the variable factors for sensitivity analysis of financial attractiveness.

Present the impact on the Equity IRR of fluctuations in the financial parameters (not considering CERs income) in the CPA PDD, as described in the CPA DD.

**Step 3: Barrier Analysis**

As alternative to the investment analysis the CPA will be entitled to utilize the barrier analysis as per the additionality tool to show that the project is additional.

The CPA operator will apply the following Sub-steps:

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity

Establish that there are realistic and credible barriers that would prevent the implementation of the proposed CPA from being carried out if the CPA was not registered as a CDM activity.

[9] EB63, Annex 5, GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS, (Version 05), Paragraph 12

The following barriers will be admissible in terms of PoA eligibility:

(a) Barriers due to prevailing practice, *inter alia*:

The project activity is the "first of its kind".
In terms of the definitions in the Tool, wind/solar power plant will be a first of its kind if no other wind/solar power plants of comparable scale (+ or – 50% installed capacity) have reached commercial operation within a selected geographic region at the time of submitting the CPA PDD for validation/inclusion into the PoA.

The procedure to demonstrate first of its kind is provided in the CPA-DD.

(b) Investment barriers, other than the economic/financial barriers in Step 2 above, inter alia:

i. No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in South Africa or due to the lack of scale for the specific projects involved.

ii. The perceived or real cost of moving to a low carbon economy at the time of CPA development may have made renewable energy so politically unpopular that the regulatory framework becomes incapable of sustaining long term investment into renewable energy;

iii. A failure to adequately address economic inequality and/or poverty in the country may lead to nationalisation of private assets, or the fear of nationalisation.

The justification and evidence to support each of the barrier claims will be elaborated on in the CPA DD, Section B.3 under Barrier Analysis.

(c) Technological barriers, inter alia:

i. Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance;

The justification and evidence to support each of the barrier claims will be elaborated on in the CPA DD, Section B.3 under Barrier Analysis.

*Sub-step 3 b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives, except the proposed project activity*
The CPA operator will demonstrate that the identified barriers do not prevent the implementation of at least one of the alternatives and will eliminate any alternative from further consideration that would be prevented by the barriers identified.

**Step 4: Common practice analysis**

In the event that a project is shown to be first-of-kind, no common practice analysis will be carried out. In other cases the common practice test will be applied as described in the CPA DD, Section B.3.

**E.5.2. Key criteria and data for assessing additionality of a CPA:**

The project participants shall justify the choice of criteria based on analysis in above section.

It shall be demonstrated how these criteria would be applied to the additionality of a CPA at the time of inclusion.

The following information will be provided to the CME for each CPA in order to demonstrate additionality as described in Section E.5.1. If the investment analysis is used to demonstrate additionality, then the parameters described in A: Financial Parameters should be presented and if the barrier analysis is used to demonstrate additionality, then the parameters in B: Barrier Parameters should be presented. If both the investment and the barrier analysis are used to demonstrate additionality, then all the parameters described in A and B should be provided in the CPA PDD.

## A. Financial Parameters

### (1) Basic parameters for calculation of financial indicators

According to the relevant project documents, the parameters needed for calculation of the real Equity IRR of the project activity are given in Table 8.

**Table 8: Assumptions made for the financial analysis**

| Item | Parameter | Value | Source |
|---|---|---|---|
| Installed capacity | MW | [Insert value] | [Provide source of the information] |
| Hours operation | Hours | [Insert value] | [Provide source of the information] |
| Net annual power generation | GWh | [Insert value] | [Provide source of the information] |
| Capacity factor | % | [Insert value] | [Provide source of the information] |
| Project lifetime | Years | [Insert value] | [Provide source of the information] |
| Total Project Cost (including Construction, Reserves, Fees and Services) | South African Rand | [Insert value] | [Provide source of the information] |
| Expected annual income* | South African Rand | [Insert value] | [Provide source of the information] |
| Annual Operation and Maintenance Cost estimate* | South African Rand | [Insert value] | [Provide source of the information] |
| Electricity price* | R/kWh | [Insert value] | [Provide source of the information] |
| Expected CER price | EUR/ton Or relevant currency | [Insert value] | [Provide source of the information] |
| Income tax rate | % | [Insert value] | [Provide source of the information] |
| Inflation rate | % | [Insert value] | [Provide source of the information] |

**Indexed by inflation over the life of the project.*

**(2) Other financial parameters**

**Table 9: Other information that is used in the financial analysis**

| Other Parameters used in the financial assessment | | | |
|---|---|---|---|
| | **Parameter** | **Source of information** | **Value applied** |
| Loan Parameters | Debt/Equity | [Insert] | [Insert] |
| | Interest of Debt | [Insert] | [Insert] |
| | Yearly interest on service accounts | [Insert] | [Insert] |
| | Loan term after construction | [Insert] | [Insert] |
| | Debt Service account | [Insert] | [Insert] |
| | Maintenance service account | [Insert] | [Insert] |
| Exchange rates | | [Insert] | [Insert] |
| Other | Project operation life cycle | [Insert] | [Insert] |
| | Corporate Tax rate | [Insert] | [Insert] |

**(3) Comparison of equity IRR for the proposed CPA and the benchmark equity IRR**

| | |
|---|---|
| Benchmark Equity IRR | [Insert figure] |
| Equity IRR without CDM income | [Insert figure] |

**(4) Sensitivity analysis**

The CPA operator will conduct a sensitivity analysis as described in the CPA DD and provide the outcome to the CME and DOE for validation purposes.

Rationale: The initial objective of a sensitivity analysis is to determine in which scenarios the project activity would pass the benchmark or become more favorable than the alternative.

**Table 10: Sensitivity Analysis**

| Parameter constituting 20% or more of project cost or revenue | -10% | -5% | 0% | 5% | 10% |
|---|---|---|---|---|---|
| Parameter 1 | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] |
| Parameter 2 | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] |
| Parameter n | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] | [Insert figure] |

**Table 11: Thresholds for parameters**

| Parameter | Increase / (Decrease) |
|---|---|
| Total Project Cost | [Insert %] |
| [Insert parameter] | [Insert %] |
| [Insert parameter] | [Insert %] |
| [Insert parameter] | [Insert %] |
| [Insert parameter] | [Insert %] |

## B. Barrier parameters

(1) Barriers due to prevailing practice

- The project activity is the "first of its kind".

Note: A proposed project activity is the First-of-its-kind in the applicable geographical area if:

"(a) The project is the first in the applicable geographical area (as the default it is South Africa, but the area can be broadened if sufficient information is available in the public domain to extend the boundary) 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; and
(b) Project participants selected a crediting period for the project activity that is a maximum of 10 years with no option of renewal."

Key criteria that should be provided to demonstrate "first of its kind"

The selection of the applicable geographical area should be motivated by the CPA Operator:
- South Africa (default)
- South Africa and neighboring countries
- Southern Africa (if information is available to confirm whether wind/solar plants of comparable scale are implemented in countries in Southern Africa)
- Africa (if information is available to confirm whether wind/solar plants of comparable scale are implemented in countries on the continent Africa)

Wind or solar power plant will be a first of its kind if no other wind or solar power plants of comparable scale have reached commercial operation within the borders of South Africa at the time of submitting the CPA PDD for validation.

Solar power plant refers to both solar PV and solar thermal applications. The two solar technologies are assessed together, therefore if a solar PV plant exists, solar thermal cannot be assessed under first of its kind and vice versa.

The following evidence should be provided to the CME:

i. Confirmation from a Renewable Energy Association(s) (for example the South African Wind Energy Association) that there are no wind/solar power plants with a comparable scale in operation at the time of validation of the CPA in the selected geographical region; or
ii. Provide a letter from the national grid operator(s) to confirm that there are no wind/solar power plants with a comparable scale in operation in the selected geographical region at the time of validation of the CPA; or
iii. Provide confirmation from a government department(s) that there are no wind/solar power plants with a comparable scale in operation in the selected geographical region at the time of validation of the CPA.
iv. For countries other than the host country, [insert the credible international sources of information used].

For the host country, supporting documentation as described in (i) to (iii) should be provided.

(2) Investment barriers, other than the economic/financial barriers in Step 2 above, inter alia:

i. No private capital is available from domestic or international capital markets due to real or perceived risks associated with investment in South Africa or due to the lack of scale for the specific projects involved.

Key evidence that should be provided

- The CPA developer has despite diligent effort failed to obtain equity or debt capital for the specific project; and/or
- The failure is due to real or perceived risks with investments in South Africa; and/or

- The scale of the project prevents debt/equity finance.

ii. The perceived or real cost of moving to a low carbon economy at the time of CPA development may have made renewable energy so politically unpopular that the regulatory framework becomes incapable of sustaining long term investment into renewable energy;

Key evidence that should be provided

- There has been a reversal in government's stated ambitions on wind and solar projects; and/or
- A demonstrable scaling down in activities in wind and solar emanating from government's stated ambitions; and/or
- The approval time for critical items like Environmental Impact Assessments have increased to an extent that significantly impedes the development of wind or solar projects; and/or
- A poor global/local financial climate has created or is creating fears that PPA counterparts, be it state or private sector, may default or renege on PPA commitments;

iii. A failure to adequately address economic inequality and/or poverty in the country may lead to nationalisation of private assets, or the fear of nationalisation.

Key evidence that should be provided

- There has been nationalisations or land grabs that have affected the investment climate generally and created undue risk
- There is particular risk of nationalisation or land grabs that will affect the project site, sites over which grid connection runs to the national grid and/ or the well-being of PPA counterparties

(3) Technological barriers, inter alia:

i. Skilled and/or properly trained labour to operate and maintain the technology is not available in the relevant country/region, which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance;

Key evidence that should be provided

- There is a shortage of trained personnel to operate and maintain the technology in South Africa which leads to an unacceptably high risk of equipment disrepair and malfunctioning or other underperformance; and/or
- Government policy prevents the employment of international workers; and/or
- The pool of available workers shows a high degree of mobility and high difficulty of workforce retention.

ii. Lack of infrastructure for implementation and logistics for maintenance of the technology. More particularly, failure to invest adequately in distribution grid maintenance may cause grid failure events where wind farms are unable to export the power they produce, or the fear of such events;

Key evidence that should be provided

- Critical infrastructure does not support the project to the degree required;
- There is a real risk that the grid may not be available to export power from the CPA when the power is available and that such occurrence may be sufficiently regular to be significant

(4) Common practice analysis

**Guidelines on Common Practice , (Version 01.0) is applied.**

**Table 12: Common Practice analysis**

| | **Outcome of the Step applied to the project activity** | **Evidence to be supplied** |
|---|---|---|
| **Step 1:** Calculate applicable output range as +/-50% of the design output or capacity of the | [Information will be provided by the CPA operator in the PDD] | No evidence needed. |

| | Outcome of the Step applied to the project activity | Evidence to be supplied |
|---|---|---|
| proposed project activity. | | |
| Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number $N_{all}$. Registered CDM project activities shall not be included in this step. | **Applicable Geographical Area:**<br>The common practice analysis is by default South Africa, but could be broadened if public information is available for the neighbouring countries.<br>Determine $N_{all}$ | The CPA operator has to motivate if the boundary is selected as South Africa only. The boundary can only be South Africa if information regarding the implementation of wind and solar projects in the neighbouring countries are not available publicly.<br><br>The CPA operator must provide a evidence from a national energy association, a government department or an international energy association to motivate the installed capacity or solar/wind power plants. For countries other than the host country, up to date statistics from international associations can be applied. References should be provided to all websites and documentation. |
| Step 3: Within plants identified in Step 2, identify those that apply technologies different than the technology applied in the proposed project activity. Note their number $N_{diff}$. | Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the CPA. Note their number $N_{diff}$. | |
| Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity. | Determine F<br><br>Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity. | The proposed CPA will be deemed a common practice (and not additional) within the renewable energy section in South Africa if both the following conditions are fulfilled:<br><br>(a) the factor F is greater than 0.2, and<br>(b) $N_{all}-N_{diff}$ is greater than 3.<br><br>If both the above are not fulfilled the project will be deemed to have passed to common practice test. |

**Sub-step 4a: Analyze other activities similar to the proposed project activity:**

On the basis of the analysis, provide supporting information to the extent to which similar initiatives have diffused in South Africa.

**Sub-step 4b: Discuss any similar Options that are occurring**

The CPA operator shall supply information on any similar options that are occurring at the time of validation.

## E.6. Estimation of Emission reductions of a CPA:

### E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical CPA:

As discussed in section E.1, the approved baseline and monitoring methodology of the Approved consolidated baseline and monitoring methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" is applied to renewable energy projects generating electricity into a grid.

According to the ACM0002, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

If the project activity is a capacity addition to existing grid-connected renewable power plant/unit, the baseline scenario is the following:

In the absence of the CDM project activity, the existing facility would continue to supply electricity to the grid at historical levels, until the time at which the generation facility would likely be replaced or retrofitted ($DATE_{BaselineRetrofit}$). From that point of time onwards, the baseline scenario is assumed to correspond to the project activity, and no emission reductions are assumed to occur.

The equations used to determine the emission reduction is discussed in E.6.2.

### E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a CPA:

**Estimation of emission reductions prior to validation**

CPA operators should prepare as part of the CDM-PDD an estimate of likely emission reductions for the proposed 10 year crediting period. Where the grid emission factor ($EF_{CM,grid,y}$) is determined *ex ante*.

**Baseline emissions**

Baseline emissions include only $CO_2$ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{GRID,CM,y}$$

Equation 1
Where:

$BE_y$ = Baseline emissions in year *y* ($tCO_2$)
$EF_{grid,CM,y}$ = Combined margin $CO_2$ emission factor for grid connected power generation in year *y* calculated using the Tool to calculate the emission factor for an electricity system. ($tCO_2$/MWh)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

*Calculation of $EG_{PJ,y}$*

The calculation of $EG_{PJ,y}$ is different for (i) greenfield plants, and (ii) capacity additions. These cases are described next:

i) Greenfield renewable energy power plants

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{Facility,y}$$

Equation 2
Where

$EF_{Facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

ii) Capacity Addition

As described in ACM0002, in the case of wind and solar plants, it is assumed that the addition of new capacity does not significantly affect the electricity generated by existing plant(s) or unit(s). The electricity fed into the grid by the added power plant(s) or unit(s) could be directly metered and used to determine $EG_{PJ,y}$.

For wind and solar power plant(s) or unit(s), the following approach is be used provided that the electricity fed into the grid by the added power plant(s) or unit(s) addition is separately metered:

$$EG_{PJ,y} = EG_{PJ\_Add,y}$$

Equation 3

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)

$EG_{PJ\_Add,y}$ = Quantity of net electricity generation supplied to the grid in year *y* by the project plant/unit that has been added under the CPA (MWh)

*Calculation of $DATE_{BaselineRetrofit}$*

In order to estimate the point in time when the existing equipment would need to be replaced/retrofitted in the absence of the project activity ($DATE_{BaselineRetrofit}$), project participants may take the following approaches into account:

(a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.;
(b) The common practices of the responsible company regarding replacement/retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment.

The point in time when the existing equipment would need to be replaced/retrofitted in the absence of the project activity should be chosen in a conservative manner, i.e. if a range is identified, the earliest date should be chosen.

Evidence should be provided by the CPA operator to the CME prior to validation.

Grid emission factor (GEF)

To calculate the grid emission factor that applies to the CPA, the "Tool to calculate the emission factor for an electricity-system" will be applied. The procedure as reflected based on the current Version 02.2.1 and is provided in Annex 3 of the CPA DD. The baseline emission factor ($EF_y$) is calculated as a combined margin (CM), consisting of the combination of simple operating margin (OM) and build margin (BM) factors.

The GEF will be calculated for each CPA at the time of CPA inclusion

Motivation for applying the simple operating margin

As described in the Tool, the simple OM method may only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Option (1) will be applied in the PoA, i.e. it should be demonstrated that in the five most recent years, the low-cost/must-run resources constitute less than 50% of total grid generation.

Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. In South Africa, these resources include hydro, wind and nuclear.

For the five years prior to 2011 (when the PoA was submitted for validation), the low-cost/must-run resources constitute less than 10% of total grid generation, as coal-fired constitutes on average 92.84%, of the total grid generation (refer to Table 13 in Annex 3), and therefore less than the required 50% of total

grid generation. It is assumed that this will remain the case for at least the next 20 years in South Africa, in which the simple operating margin can be applied.

At the time of inclusion of the CPA into the PoA, the CME will check and confirm that the simple operating margin can still be applied to determine the grid emission factor.

**Project emissions**

$$PE = PE_{FF,y}$$

Equation 4
Where:
PEy = Project emissions in year y (tCO2e/yr)
$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO2/yr)

Project emissions are zero for CPAs, PEy = 0.

Motivation: CPAs eligible for inclusion in this PoA may utilise Solar Thermal or Photovoltaic energy or wind power. The eligibility criteria specify that solar thermal CPAs must not co fire fossil fuel, hence removing the need to consider project emissions.

**Leakage**

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are omitted.

**Emission reductions**
Emission reductions are calculated as follows:

$$ER_y = BEy - PEy$$

Equation 5
Where:
$ER_y$ = Emission reductions in year y (t $CO_2$e/yr)
$BE_y$ = Baseline emissions in year y (t $CO_2$/yr)
$PE_y$ = Project emissions in year y (t $CO_2$e/yr)

**Changes required for methodology implementation in 2nd and 3rd crediting periods**

The CPAs can only apply use the 10 year crediting period option. Therefore, no changes are required for a 2nd and 3rd crediting period.

**E.6.3. Data and parameters that are to be reported in CDM-CPA-DD form:**

Detailed information on the data and parameters that do not require monitoring are described below. Data and parameters used for ex-ante calculation that need to be monitored after project implementation are shown in E.7.1.

| **Data / Parameter:** | $FC_{i,y}$ |
|---|---|
| Data unit: | Ton or litres |
| Description: | Amount of fossil fuel type *i* consumed in the project electricity system in year *y* |
| Source of data used: | Utility or government records or official publications. |
| Value applied: | The CPA operator will supply the relevant information in Annex 3 of the CPA-PDD. |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | As per "Tool to calculate the emission factor for an electricity system"<br>(i)Simple OM: Once for the crediting period using the most recent three historical years for which data is available at the time of submission of the CPA to the PoA (*ex ante* option);<br>(ii)BM: Once *ex ante* as there is only one crediting period. |
| Any comment: | - |

| **Data / Parameter:** | $NCV_{i,y}$ |
|---|---|
| Data unit: | GJ/mass or volume unit |
| Description: | Net calorific value (energy content) of fossil fuel type *i* in year *y* |
| Source of data used: | The following data sources may be used if the relevant conditions apply:<br>• CME will collect the relevant information and can provide the information to the CPA operator.<br>• The following sources may be applied:<br><br>**Data source** / **Conditions for using the data source**<br>Values provided by the fuel supplier of the power plants in invoices / If data is collected from power plant operators (e.g. utilities)<br>Regional or national average default values / If values are reliable and documented in regional or national energy statistics/energy balances<br>IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories / |
| Value applied: | CPA operator will provide the value in the CPA PDD |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | As per "Tool to calculate the emission factor for an electricity system" |
| Any comment: | |

| **Data / Parameter:** | $EG_y$ |
|---|---|
| Data unit: | MWh |
| Description: | Net electricity generated by power plant/unit *m* (or in the project electricity system in case of $EG_y$) in year *y* |
| Source of data used: | Public available information as supplied by the national energy regulator or the national utility or by power stations. |
| Value applied: | CPA operator will provide the value in the CPA PDD |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | As per "Tool to calculate the emission factor for an electricity system".<br>Monitoring frequency is once for each crediting period using the most recent three historical years for which data is available at the time of submission of the CPA-PDD to the DOE for validation. |
| Any comment: | |

| **Data / Parameter:** | $EF_{GRID,CM}$ |
|---|---|
| Data unit: | $tCO_2$ / MWh |
| Description: | Emission factor of the national electrical grid |
| Source of data used: | Calculated based on the public available information from the national utility and IPCC information where applicable |
| Value applied: | CPA operator will provide the value in the CPA PDD |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The $EF_{grid,y}$ is calculated according to the 'Tool to calculate the emission factor for an electricity system'. The Simple OM method is used to calculate the Operating margin (using the ex-ante option); with the Build Margin also calculated ex-ante based on the most recent information. |
| Any comment: | |

| **Data / Parameter:** | $EF_{CO2,i,y}$ |
|---|---|
| Data unit: | $tCO_2/GJ$ |
| Description: | $CO_2$ emission factor of fossil fuel type *i* in year *y* |
| Source of data used: | The following data sources may be used:<br>Data source: Values provided by the fuel supplier of the power plants in invoices — Conditions for using the data source: If data is collected from power plant operators (e.g. utilities)<br>Data source: Regional or national average default values — Conditions for using the data source: If values are reliable and documented in regional or national energy statistics / energy balances<br>Data source: IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories — Conditions for using the data source: |
| Value applied: | CPA operator will provide the value in the CPA PDD |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | As provided in the 'Tool to calculate the emission factor for an electricity system'.<br>The CPA operator will motivate why the data source was selected. |
| Any comment: | |

| **Data / Parameter:** | $EF_{grid,OMsimple,y}$ |
|---|---|
| Data unit: | $tCO_2/MWh$ |
| Description: | Simple operating margin $CO_2$ emission factor in year *y* |
| Source of data used: | CME will calculate the simple operating margin based on public available for the national grid. |
| Value applied: | CPA operator will provide the applicable information in the CPA PDD. |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The Simple OM method is used to calculate the Operating margin (using the ex-ante option) according to the "Tool to calculate the emission factor for an electricity system". |
| Any comment: | |

| **Data / Parameter:** | $EF_{grid,BM,y}$ |
|---|---|
| Data unit: | tCO2/MWh |
| Description: | Build margin CO2 emission factor in year *y* |
| Source of data used: | CME will calculate the build margin based on public available for the national grid. |
| Value applied: | CPA operator will provide the applicable information in the CPA PDD |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The build margin is calculated according to the "Tool to calculate the emission factor for an electricity system". Build Margin is calculated ex-ante based on the most recent public available information for the national grid. |
| Any comment: | |

| **Data / Parameter:** | $DATE_{BaselineRetrofit}$ |
|---|---|
| Data unit: | Date |
| Description: | Point in time when the existing equipment would need to be replaced in the absence of the project activity |
| Source of data: | CPA site |
| Measurement procedures (if any): | (a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.;<br>(b) The common practices of the responsible company regarding replacement/retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment. |
| Any comment: | The point in time when the existing equipment would need to be replaced/retrofitted in the absence of the project activity should be chosen in a conservative manner, i.e. if a range is identified, the earliest date should be chosen. |

## E.7. Application of the monitoring methodology and description of the monitoring plan:

### D.7.1. Data and parameters to be monitored by each CPA:

| **Data / Parameter:** | $EG_{facility,y}$ |
|---|---|
| Data unit: | MWh |
| Description: | Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* |
| Source of data to be used: | CPA operator |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | CPA operator will provide the figure in the CPA PDD. |
| Description of measurement methods and procedures to be applied: | Electricity meters will be used to meter the electricity exported to the grid continuously.<br>Continuous measurement and at least monthly recording. |
| QA/QC procedures to be applied: | Cross check measurement results with records for sold electricity |
| Any comment: | - |

| **Data / Parameter:** | $EG_{PJ\_Add,y}$ |
|---|---|
| Data unit: | MWh |
| Description: | Quantity of net electricity generation supplied to the grid in year y by the project plant/unit that has been added under the project activity (MWh) |
| Source of data to be used: | CPA operator |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | CPA operator will provide the figure in the CPA PDD. |
| Description of measurement methods and procedures to be applied: | Continuous measurement and at least monthly recording |
| QA/QC procedures to be applied: | - |
| Any comment: | Applicable to wind and solar power plant(s) or unit(s), provided that option 2 in the baseline methodology is applied. |

### E.7.2. Description of the monitoring plan for a CPA:

Please refer to Section 4.4.1 and Section 4.4.2 for a full description of the database and the information that will be available for each CPA.

Each installed wind or solar power plant is uniquely identifiable by an identification number and the CME will maintain a database of all wind and solar power plants installed in under the PoA.

The CPA PDD will contain the following information:

**1. Monitoring management structure**

In order to obtain effective monitored data, the CPA operator will identify the responsible persons for monitoring, data collection and archiving on site. The management structure will be presented in the CPA PDD.

The main data for calculating emission reductions of the project activity is $EG_{facility,y}$ (Net electricity supplied to grid by the wind power plant in year y) monitored by electricity meters. The data of $EG_{facility,y}$ will be crosschecked against the relevant monthly electricity sale receipts (and purchases) and/or records from the grid.

For capacity additions, $EG_{PJ\_Add,y}$ is metered, i.e. the net electricity generation supplied to the grid in year y by the project plant/unit that has been added under the project activity in MWh.

**2. Calibration of Meters**

The calibration frequency is at least once a year or as specified by the equipment supplier.

**3. Metering**

The CPA operator will be responsible to meter the following monitoring parameters:

a) Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*.
b) Quantity of net electricity generation supplied to the grid in year y by the project plant/unit that has been added under the project activity (in the case of capacity addition).

**4. Data collection**

a. Responsible entities that will collect and store data

Data will be collected by each CPA operator on site. The data will be entered into an excel spreadsheet for which the template will be provided to the CPA operator. The information from the excel spreadsheet will be transferred into the database on a monthly basis. The CPA operator will collect the relevant evidences for power delivered to the grid by the wind/solar energy facility and additional data (including the amount of electricity purchased from the grid).

b. Data transfer and storage

The information that is entered by the CPA operators into the excel template on a monthly basis will be transferred into the CME database on a monthly basis. The information will be stored in the CME database for the full duration of the POA.

c. Quality control

The CME will conduct an audit on each CPA every 6 months to ensure that all the relevant data is collected and that the necessary support documentation is collected and stored adequately for verification purposes.

d. Duration of archiving of information at the CPA site

All data for the CPA will be archived for a minimum period of 2 years after the end of the crediting period for the CPA.

e. Training and monitoring personnel

The CME will confirm that all persons that participate in the monitoring process will be suitably qualified and trained in the operation and maintenance of the CPA project activity. These persons will also receive training on the application of the monitoring plan.

**6. Location of monitors installed on site (if available at the time of validation)**

[If sufficient information regarding the proposed location of the monitors are available at the time that the CPA PDD is submitted, please provide a schematic diagram of the location of the monitors in Annex 4 of the CPA PDD.]

**E.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)**

12 October 2011

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## Annex 1

## CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and PARTICIPANTS IN THE PROGRAMME of ACTIVITIES

| | |
|---|---|
| Organization: | CDM Africa Climate Solutions (Pty) Ltd |
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| Represented by: | Ciska Terblanche |
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| | |
|---|---|
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| Represented by: | Johan van den Berg |
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## Annex 2

## INFORMATION REGARDING PUBLIC FUNDING

The CPA operator has to supply information regarding public funding in Annex 2 of the CPA-PDD. Please complete the following:

If public funding from an Annex 1 country is involved in this CPA, the Annex 1 party or the CPA operator has to provide affirmation that such funding does not result in a diversion of official development assistance.

## Annex 3

## BASELINE INFORMATION

Table 13: Sources of electricity generated into the RSA national grid

| Type of power plant | Years* | | | | | Average | Share |
|---|---|---|---|---|---|---|---|
| | 04.2005 - 03.2006 | 04.2006 - 03.2007 | 04.2007 - 03.2008 | 04.2008 - 03.2009 | 04.2009 - 03.2010 | | |
| Coal-fired | 206 606 | 215 211 | 222 908 | 211 941 | 215 940 | 214 521 | 92.84% |
| Hydro-electric | 1 141 | 2 443 | 751 | 1 082 | 1 274 | 1 338 | **0.58%** |
| Pumped storage | 2 867 | 2 947 | 2 979 | 2 772 | 2 742 | 2 861 | **1.24%** |
| Gas turbine | 78 | 62 | 1 153 | 143 | 49 | 297 | 0.13% |
| Nuclear | 11 293 | 11 780 | 11 317 | 13 004 | 12 806 | 12 040 | **5.21%** |
| Wind energy | 3 | 2 | 1 | 2 | 1 | 2 | **0.00%** |
| Total net generation | 221 988 | 232 445 | 239 109 | 228 944 | 232 812 | 231 060 | 100.00% |

*A reporting year for Eskom starts on the 1st of April and finishes on the 31st of March.

Source of information: Eskom Annual Report 2010, page 1,
http://www.eskom.co.za/annreport10/downloads/eskom_ar2010.pdf

## Annex 4

## MONITORING INFORMATION

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