



**CLEAN DEVELOPMENT MECHANISM
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)
Version 01**

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Appendix 1: List of Abbreviations

NOTE:

- (i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.
- (ii) The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)^{1,2} that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD 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). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

¹ The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

² At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

**SECTION A. General description of CDM programme activity (CPA)³****A.1. Title of the CPA:**

CPA '###' under PoA 'South African Large Scale Grid Connected Solar Park Programme'

Version number: '###'

Date: 'Date of completion of drafting of a CPA-DD in format DD/MM/YYYY'

A.2. Description of the CPA:

This CPA falls under sectorial scope: Energy industries (renewable-/ non renewable sources); Type: Renewable energy; and category: Electricity generation and supply.

The purpose of the CPA is 'specify the purpose'

CPA '###' envisages [select appropriate]

1. the installation of a new grid connected solar park at a site where no solar park was operated prior to the implementation of the CPA; or
2. the capacity addition of an existing grid connected solar park.

'Provide a description of the CPA according to the following details:

- CPA capacity;
- Technology or measures to be employed;
- Information on the Power Purchase Agreement which the CPA developer is going to sign (Government PPA or Private PPA);
- Location of the CPA;
- CPA developer's name;
- Implementation schedule of the CPA (in date format DD/MM/YYYY);
- A description of the scenario prior to the CPA and how the CPA reduces greenhouse gas emissions; as well as
- Other relevant information (if required).'

This CPA satisfies all sustainable development goals identified in the CDM-PoA-DD. The main benefits of the implementation of the present CPA are:

1. Social and economic: [XXX]
2. Environmental: [XXX]
3. Other: [XXX]

³ Yellow colour points to the place where either the instruction is given or CPA developer has to insert value/date/explanation/details. When green colour is used the CPA developer has to choose from the provided options

**A.3. Entity/individual responsible for CPA:**

‘Solar park developer name’ (Specify whether the “Entity/individual responsible for CPA” is a private or public entity) is an entity responsible for CPA implementation

‘Briefly describe the entity’

‘State briefly about the CME and that it has obtained the mandate from the entity/entities responsible for the CPA to include the project activity/activities into the PoA’

A.4. Technical description of the CPA:

This CPA falls under sectorial scope: Energy industries (renewable-/ non renewable sources); Type: Renewable energy; and category: Electricity generation and supply.

‘Brief description of the CPA, type of technology, measures, expected technology supplier (if possible)’

The present CPA generates ‘Capacity of CPA’ MW and annually produces ‘Net electricity production’ MWh of electricity. The generated renewable electricity is then distributed to [define the consumer (in case of Private PPA) and electricity network].

A.4.1. Identification of the CPA:

CPA ‘###’ (under the South African Large Scale Grid Connected Solar Park Programme)

A.4.1.1. Host Party:

The Republic of South Africa (RSA)

A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

‘Insert a description of the location of the CPA. As a minimum the information should include the region/province and GPS co-ordinates.’



Figure A.4-1: CPA location within the RSA [Indicate CPA location with a red dot]

[Insert the detailed map(s)]

Insert conclusion that activity under this CPA is located within the geographical boundary of the RSA and conforms to NEMA regulation. Provide necessary evidences]

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

‘CPA starting date: dd/mm/yyyy in conformity with Glossary of CDM terms (Version 07)⁴ (add description)’

A.4.2.2. Expected operational lifetime of the CPA:

‘CPA technical lifetime in format (years, months) with reference in conformity with Annex 15, EB 50’

⁴ http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf

**A.4.3. Choice of the crediting period and related information:**

‘Choose the applicable crediting period for the CPA, either Renewable or Fixed Crediting Period’

A.4.3.1. Starting date of the crediting period:

‘Expected starting date of operation of CPA in format ‘dd/mm/yyyy’ or the date of inclusion of the CPA in the PoA; whichever is later.

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

‘Choose according to applicable crediting period as in section A.4.3, either 7 years 0 months or 10 years 0 months’

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions in tonnes of CO ₂ e
‘Year 1’ (From ‘starting date of CPA’ to 31/12/ ‘Year1’)	
‘Year 2’	
‘Year 3’	
‘Year 4’	
‘Year 5’	
‘Year 6’	
‘Year 7’	
‘Year 8’ (From 01/01/ ‘Year 8’ to ‘end of month preceding month of starting date of crediting period’) ⁵	
‘Year 9 for fixed crediting period only’	
‘Year 10 for fixed crediting period only’	
‘Year 11’ (From ‘DD/MM/YYYY’ to ‘DD/MM/YYYY’ (end of month preceding month of starting date of crediting period)) ⁶	
Total estimated reductions (tonnes of CO₂ e)	
Total number of crediting years	‘7 or 10’
Annual average over the crediting period of estimated reductions (tonnes of CO₂ e)	

A.4.5. Public funding of the CPA:

[Insert the conclusion that no official Development Aid is involved or diverted as a result of the project activity/activities under the CPA⁷. The official declarations of ‘no development aid’ have to be provided

⁵ NOTE: In the event that this is a renewable crediting period and the crediting period starts on 1st of January of ‘Year1’ there will be no overlap between years. In this case ‘Year 8’ will be omitted.

⁶ NOTE: In the event that this is a fixed crediting period and the crediting period starts on 1st of January of ‘Year 1’ there will be no overlap between years. In this case ‘Year 11’ will be omitted.



NAME /TITLE OF THE PoA: South African Large Scale Grid Connected Solar Park Programme



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by the wind farm developers. If Annex 1 countries are involved, then a declaration from the concerned agency in Annex 1 country should also be submitted]

A.4.6. Confirmation that CPA_ is neither registered as an individual CDM project activity nor is part of another Registered PoA:

CPA '###' is not registered as an individual CDM project activity or as part of another registered PoA⁸.
[A signed declaration to this effect should be furnished]

⁷ See section B.2 – eligibility criterion 11.

⁸ See section B.2 – eligibility criterion 3.

**SECTION B. Eligibility of CPA and Estimation of emissions reductions****B.1. Title and reference of the Registered PoA to which CPA is added:**

Title of the registered PoA: South African Large Scale Grid Connected Solar Park Programme⁹

Version number: 3.0

Date: 11/12/2012

B.2. Justification of the why the CPA is eligible to be included in the Registered PoA :

Compliance with the eligibility criteria according to the CDM-PoA-DD are demonstrated in Table B.2-1.

Table B.2-1: Compliance with Eligibility criteria (also refer to Table A.4-1 in CDM-PoA-DD)

PoA Eligibility criteria (Table A.4-1 in CDM-PoA-DD)	Compliance with eligibility criteria/ Mean of proof	Supporting document
1. The CPA is in the geographical area of the Republic of South Africa (RSA).	'Provide description	a) Environmental Authorization (EA) from the relevant Competent Authority (CA) of the RSA ¹⁰ and b) Host Country approval from the DNA
2. The location of the CPA is uniquely identified by the GPS coordinates. The GPS coordinates has been crosschecked with previous records of GPS coordinates of existing CPAs under this PoA to ensure that no overlap between activities can occur.	'Provide description	'The GPS coordinates of the CPA and EA from the relevant CA of the RSA or EIA or basic assessment report'

⁹ hereinafter "the PoA"

¹⁰ The Department of Environmental Affairs at the time of PoA-DD drafting



<p>3. The CPA owner has contractually agreed and signed the following:</p> <p>a) The CPA has neither been and will not be registered as a CDM project activity, nor as a CPA under another PoA; and</p> <p>b) The owner is aware that the activity will be subscribed to the present PoA.</p>	<p>‘Provide description’</p>	<p>‘Signed declaration from the owner of the CPA’</p>
<p>4. The CME has checked the UNFCCC CDM project database to verify that the proposed CPA has not been previously submitted to the UNFCCC. If the CPA has been submitted to the UNFCCC for validation or registration, the CPA developer has to prove that the process of validation or registration has been withdrawn.</p>	<p>‘Provide description’</p>	<p>‘Signed declaration from the CME or from the CPA owner (if applicable)’</p>
<p>5. The CPA is one of the following:</p> <p>a) The installation of a new grid connected solar park at a site where no solar park was operated prior to the implementation of the CPA; or</p> <p>b) The capacity addition of an existing grid connected solar park, herewith the electricity generation at existing solar park should not be affected by the CPA.</p>	<p>The CPA is “insert one a), b)”</p>	<p>‘Completed EIA or basic assessment report’</p>



<p>6. The CPA is connected to the national grid of the RSA via either:</p> <p>a) The national transmission, distribution or reticulation lines;¹¹ or</p> <p>b) A municipal electricity network that is connected to the national transmission, distribution or reticulation lines.</p>	<p>The CPA is connected to the national grid of the RSA via “insert one a) or b)”</p>	<p>‘Power Purchase Agreement or permission to connect to the grid or application for any programme which intends to supply power to the grid or (in case documents mentioned above are not available) completed EIA or basic assessment report or feasibility study report’</p>
<p>7. The start date of the CPA is clearly defined in the CPA-DD with supporting documentary evidence and is later than the date of start of global stakeholder process for the PoA (05/04/2012).</p>	<p>‘Provide description’</p>	<p>‘In case the project has started (anyone of the documents below): a) financial close; b) the signed contract with the construction company to build the solar park or other evidence to confirm that construction has started; c) Signed contract with a supplier of solar electrical system or Purchase Order. The CME shall check the documents and determine the earliest one and take the date of the document as a start date of the CPA, then compare the date with the 05/04/2012. If the start date is later than 05/04/2012, consider for inclusion.</p> <p>In case the project has not started (future project): the signed declaration from the CPA owner regarding anticipated starting date’</p>
<p>8. The CPA is in line with applicability conditions of ACM0002</p>	<p>‘Provide description’</p>	<p>‘Signed declaration from the CME’</p>

¹¹ ‘Eskom grid’ at the time of drafting of the PoA-DD



9. Additionality was demonstrated individually for the CPA according to the procedures described in the Section E.5.1 of the CDM-CPA-DD.	'Provide description'	<p>'If Step 0 in Section B.3 is demonstrated:</p> <p>The list of power plant servicing the grid and their capacity.</p> <p>If Step 0 in Section B.3 is not demonstrated:</p> <p>IRR worksheets together with documentary evidence for all input parameters and, assumptions. The list of power plant servicing the grid and their capacity.'</p>
10. The environmental impact assessment required by NEMA ¹² regulations and CDM local stakeholder consultations has been completed.	'Provide description'	'EA from the relevant CA of the RSA and photo copy of newspaper where invitation was published or copies of invitation sent to local stakeholders, and minutes of the meeting and list of attendance and list of comments received'
11. No official Development Aid will be involved or diverted as a result of the CPA. The official declaration of 'no development aid' has been provided by the solar park developer. If Annex 1 countries are involved, then a declaration from the concerned agency in Annex 1 country should also be submitted .	'Provide description'	'Signed declaration from the CPA developer <u>and</u> the concerned agency in Annex 1 country (if involved)'
12. In case of CPA is capacity addition to the existing solar park, it does not affect the radiation received by the existing power plant and the electricity fed into the grid by the added power plant addition is separately metered.	'Provide description'	'Feasibility study report and power plant design or site visit to confirm that the electricity generation at the existing power plant will not be affected by the CPA and the electricity fed into the grid by the added power plant addition is separately metered'

¹² NEMA: National Environmental Management Act



13. The owner of the CPA is duly registered/incorporated entity of the RSA.	'Provide description'	'Company registration / incorporation certificate issued by Registrar of Companies'
14. A CME has checked that the CPA satisfies the eligibility criteria of the latest version of the PoA-DD. ¹³	'Provide description'	'Signed declaration by the CME'

[Reference] Eligibility #5 & #6: Applicability

The proposed CPA will be a grid-connected renewable power generation project and is applicable to ACM0002 since it falls under: **[Choose either (a) or (b)]**

(a) Installation of 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

(b) Involve a capacity addition;

Moreover the CPA meets all necessary applicability conditions of the ACM0002 methodology as listed in Table B.2-2 below.

Table B.2-2: Applicability conditions for ACM0002

Applicability condition	Applicability	Reasoning
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.	Applicable /Not Applicable	'Provide description'

¹³ Additional criterion identified by the CME



Applicability condition	Applicability	Reasoning
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 addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	Applicable /Not Applicable	'Provide description
<p>In case of hydro power plants, at least one of the following conditions must apply:</p> <ul style="list-style-type: none"> The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m² after the implementation of the project activity; or <p>(i) The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m² after the implementation of the project activity</p>	Applicable /Not Applicable	'Provide description



Applicability condition	Applicability	Reasoning
<p>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:</p> <ul style="list-style-type: none"> • The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2; • All reservoirs and hydro power plants are located at the same river and where are designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant; • The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • 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 15MW; • 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. 	<p>Applicable /Not Applicable</p>	<p>‘Provide description</p>
<p>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.</p>	<p>Applicable /Not Applicable</p>	<p>‘Provide description</p>
<p>Biomass fired power plants.</p>	<p>Applicable /Not Applicable</p>	<p>‘Provide description</p>



Applicability condition	Applicability	Reasoning
Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the reservoir is less than 4 W/m ² .	Applicable /Not Applicable	'Provide description
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"	Applicable /Not Applicable	'Provide description

CPA '###' is eligible to the PoA because it complies with the eligibility criteria as defined in section A.4.2.2 of the CDM-PoA-DD.

B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:

The additionality of the CPA is demonstrated and assessed using the "Tool for the demonstration and assessment of additionality" (Version 07.0.0), from EB 70, Annex 08¹⁴ (hereinafter in Section B.3. referred to as 'the Additionality Tool').

Prior consideration of the CDM

The start date of the CPA is 'dd/mm/yyyy', which is after the commencement of the validation of PoA (05/04/2012). The CPA has informed UNFCCC on 'dd/mm/yyyy' and DNA on 'dd/mm/yyyy' which is within 6 months from the start date of the project activity and hence the CPA conforms to Annex 13, EB 62 read with Annex 26, EB 60.

The additionality of the CPA is demonstrated and assessed using the procedures described in section E.5.1 of the PoA-DD.

'If the project participant demonstrates that the project is first-of-its-kind (FOIK) proceed with Step 0, otherwise skip this step'

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

Project participant will demonstrate that this project is first-of-its-kind according to the definition provided in the "Guidelines on additionality of first-of-its-kind project activities" (Version 02.0)¹⁵ Annex

¹⁴ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools> (this version of the tool will be applied throughout the document.)

¹⁵ http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid43.pdf



7, EB69, (hereinafter in Section B.3. referred to as ‘the Guidelines’). According to paragraph 2(b) of the Guidelines, each CPA under this PoA will fall under “power generation based on renewable energy”.

The CPA will be first-of-its-kind as per the paragraph 5 of the Guidelines if:

(a) The CPA is the first in the applicable geographical area (RSA) that applies a technology that is different from technologies that are implemented by any other project, which are able to deliver the same output and have started commercial operation in the applicable geographical area (RSA) before the CPA is published for global stakeholder consultation or before the start date of the proposed CPA, whichever is earlier;

(b) The project implements one or more of the measures (this criterion will be satisfied for all CPAs under this PoA since they apply “power generation based on renewable energy”);

(c) The project participants selected a crediting period for the CPA that is “a maximum of 10 years with no option of renewal”.

As per paragraph 4: *Different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed clean development mechanism (CDM) project activity and applicable geographical area):*

(a) *Energy source/fuel (example: energy generation by different energy sources such as wind and hydro and different types of fuels such as biomass and natural gas);*

(b) *Feed stock (example: production of fuel ethanol from different feed stocks such as sugar cane and starch, production of cement with varying percentage of alternative fuels or less carbon-intensive fuels);*

(c) *Size of installation (power capacity)/energy savings:*

(i) *Micro (as defined in paragraph 24 of decision 2/CMP.5 and paragraph 39 of decision 3/CMP.6);*

(ii) *Small (as defined in paragraph 28 of decision 1/CMP.2);*

(iii) *Large.*

Typically the following characteristics of each proposed project activity looking to demonstrate FOIK will be required:

1. **Technology:** ‘Choose PV solar electrical system or CSP’.
 - **Energy source:** Energy generation by solar radiation
 - **Size of installation:** ‘Choose Large or small’
2. **Output:** Electricity to be supplied to the national grid.
3. **Geographical area:** The applicable geographical area for this project is Republic of South Africa
4. **Measure:** Power generation based on renewable energy
5. **Project start date:** ‘This need to be specified for the particular project in the format dd/mm/yyyy’
6. **Date of start of GSC:** 05/04/2012
7. **Crediting Period:** A crediting period of 10 years with no option of renewal will be used



‘Give description of a similar activity according to these characteristics and compare to current power plants servicing the grid’

‘Draw a conclusion if CPA is first-of-its-kind’

If Step 0 was skipped, the additionality of the CPA will be demonstrated using the Additionality Tool, read with “Guidelines on the Assessment of Investment Analysis” (Version 05.0.0), from EB 62, Annex 05¹⁶ (hereinafter referred to as ‘the Guidance’) by proceeding with the following steps:

Step 1: Alternatives to the project activity

The alternatives available to the solar park developer include:

- (a) The proposed project activity undertaken without being registered as a CDM project activity;
- (b) Continuation of the current situation (no project activity or other alternatives undertaken).

Both the alternatives are credible, realistic and are in conformity with the applicable mandatory legal and regulatory requirements as the implementation of the project activity is a voluntary initiative, is not mandated by any legal requirement, and there is no legal requirement on the choice of a particular technology or restriction on the use of solar energy. Moreover, the approved methodology ACM0002 also prescribes the baseline. Where the approved methodology prescribes the baseline, discussion on alternatives is not necessary. Accordingly, all the CPAs included under this PoA will use the baseline prescribed by the methodology ACM0002.

Step 2: Investment Analysis

Since the baseline for all the CPAs do not require any investment and is outside the direct control of the CPA operator, the CPA developer shall demonstrate the project activity in the proposed CPA is not economically or financially feasible using benchmark analysis (Option III), in conformity with guidance 19 of Annex 5, EB 62, as well as sensitivity analysis, as per guidance 20 and 21 of Annex 5, EB 62 read with sub-step 2d of the Additionality Tool (Version 07) and then proceed to the common practice analysis as follows¹⁷:

Sub-step 2b: Apply benchmark analysis (Option III)

Sub-step 2c: Calculation and comparison of financial indicators

Sub-step 2d: Sensitivity analysis

Step 4 : Common practice analysis

Details of each step are presented below.

Sub-step 2b: Apply benchmark analysis (Option III)

According to paragraph 36 of the Additionality Tool the most suitable financial/economic indicator, namely, *post tax project Internal Rate of Return* (IRR) will be used as financial indicator. However,

¹⁶ http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf this version of the Guidelines will be used throughout this document.

¹⁷ Refer to paragraphs 2, 8, 29 and 31 of the “Tool for the demonstration and assessment of additionality” (version 07.0.0) as well as “Guidelines on the assessment of investment analysis” (Version 05)



where the project is financed 100.00% by equity, *post tax equity IRR* will be used as financial indicator to demonstrate the additionality of the project.

After selecting the most suitable financial indicator for the project type and decision making context, the CPA developer shall determine the appropriate benchmark.¹⁸

In accordance with paragraph 12 of the Guidance, commercial lending rate or WACC will be chosen as benchmark for the project IRR. Where commercial lending rate is chosen as the benchmark, the rate will be term lending rates sourced from the latest Quarterly Bulletin published by the South African Reserve Bank¹⁹ available at the time of decision making. Where WACC is used as benchmark, debt equity ratio applicable to renewable energy projects will be used as the weights; term lending rates sourced from the latest Quarterly Bulletin published by the South African Reserve Bank available at the time of decision making will be used for cost of debt; the average tax rate applicable to the project activity based on the projected profitability statement²⁰ will be used to arrive at the post cost of debt and expected return on equity will be arrived at by (a) selecting the default values provided in the latest version of the “Guidelines on the assessment of investment analysis” duly converted to nominal rate based on the guidance provided in the Appendix to Annex 5, EB 62; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated.

Required/expected returns on equity are appropriate benchmarks for equity IRR. The return on equity will be determined in the project context either by (a) selecting the default values provided in the latest version of the “Guidelines on the assessment of investment analysis” duly converted to nominal rate based on the guidance provided in the Appendix to Annex 5, EB 62; or by (b) calculating the cost of equity using best financial practices, or by (c) selecting the commercial lending rate as the expected return on equity based on data sources which can be clearly validated.

Sub-step 2c: Calculation and comparison of financial indicators

In the course of this step the CPA developer shall calculate the chosen financial indicator for each CPA and compare it with the benchmark.

The project developer will *include all relevant costs (including, for example, the investment cost, the operations and maintenance costs, administrative cost, insurance cost, socio-economic development cost etc), and revenues (excluding CER revenues, including inter alia subsidies/fiscal incentives²¹, ODA, etc* while calculating the financial indicator.

Table B.3-1 shows the typical input data that is required to calculate IRR for each activity under the CPA.

¹⁸ Refer to paragraph 36 of “Tool for the demonstration and assessment of additionality” (version 07.0.0) as well as paragraph 12 of the “Guidelines on the assessment of investment analysis” (Version 05)

¹⁹ The rate will be sourced from Quarterly Bulletin published by the South African Reserve Bank www.reservebank.co.za

²⁰ The conversion of cost of debt to post cost basis is done to remove the tax shield provided by the interest. In several cases the CPAs will not be required to pay taxes in the initial years due to accelerated depreciation benefits given to solar parks projects by the Income Tax Act of South Africa. When the project itself is not subject to taxation, the question of interest providing tax shield does not arise. Hence, the average tax rate of the project is proposed to be considered, which is appropriate

²¹ “See EB guidance on the consideration of national/local/sectoral policies and measures for the baseline setting”

**Table B.3-1: Typical input data to calculate IRR for each activity under the CPA**

Parameter	Unit ²²	Data source/comment
Capacity of the solar park	MW	Board resolution <u>and/or</u> approved Business Plan <u>and/or</u> Feasibility Study <u>and/or</u> EIA <u>and/or</u> Basic assessment <u>and/or</u> , purchase order <u>and/or</u> PPA
Load factor of the solar park (PLF)/Generation	Ratio/MWh	Report developed by a third party contracted by the project participants <u>and/or</u> , PLF provided to banks <u>and/or</u> equity financiers while applying the activity for financing, <u>and/or</u> to the government while applying the activity for implementation approval
Transmission and transformation losses	MWh/year (or ratio)	Feasibility Study <u>and/or</u> estimation carried out by a third party
Auxiliary electricity consumption	MWh/year (or ratio)	Feasibility Study <u>and/or</u> estimation carried out by a third party
Electricity tariff	ZAR/MWh	Applicable average NERSA Tariff available in public domain conforming to guidance 6 of Annex 5, EB 62. (Please see further explanation given below)
The cost of transportation of electricity to the consumer	ZAR/MWh	Agreement <u>or</u> MOU <u>or</u> Letter of Intent between the solar park developer and the operator of power lines, through which the electricity will be supplied (applicable only for private sale)
Wheeling charges	ZAR/MWh	Agreement <u>or</u> MOU <u>or</u> Letter of Intent between the solar park developer and the operator of power lines, through which the electricity will be supplied (applicable only for private sale)
Total investment cost	ZAR in mn.	Feasibility Study <u>and/or</u> offer letters/quotations from the machinery supplier/construction/O&M contractors conforming to guidance 6 of Annex 5, EB 62
Debt/Equity ratio	Ratio	Feasibility study report <u>or</u> the Board Note <u>or</u> the term sheet from the lending bank <u>or</u> the debt equity ratio applicable to solar power projects in RSA <u>or</u> the default ratio of 50/50 as per guideline 18 of

²² Other currencies may also be used.



Parameter	Unit ²²	Data source/comment
		Annex 5, EB 65 if the debt equity ratio applicable to solar power projects in RSA is not available
The cost of debt	%	Feasibility study report <u>or</u> the Board Note <u>or</u> the term sheet from the lending bank <u>or</u> term lending rates sourced from the latest Quarterly Bulletin published by the South African Reserve Bank <u>or</u> the cost of debt reckoned in the establishing of the benchmark
Repayment period	Years	Feasibility study report <u>or</u> Board Note <u>or</u> the term sheet from the lending bank <u>or</u> any credible document
Initial grace period	Months/years	Feasibility study report <u>or</u> Board Note <u>or</u> the term sheet from the lending bank <u>or</u> any credible document
Operations and Maintenance (O&M) costs	ZAR/MW <u>or</u> ZAR/WTG <u>or</u> ZAR in mln.	Feasibility Study <u>and/or</u> offer letters/quotations from the machinery supplier/construction/O&M contractors conforming to guidance 6 of Annex 5, EB 62
Administrative expenses	ZAR /year	Board Note duly supported by the organizational structure and wage/salary level including benefits, travel and conveyance, communication expenses etc.
Escalation for tariff, O&M cost and administrative expenses	Percent	CAGR of Consumer Price Index from 2008 till the decision making date. The data will be sourced from Statistics South Africa



Parameter	Unit ²²	Data source/comment
Lease rent for land	ZAR/year or % or ZAR/year per turbine	Term sheet / Agreement between the project developer and the land owner or land operator
Insurance premiums	ZAR (or ZAR/year)	Offer letter from the insurance company or credible public domain documents
Social development fee	Percent of revenue or ZAR/MWh or ZAR/year	The agreement or MoU or Letter of Intent between the solar park developer and the payee or the bid document or the Board resolution
The useful lifetime of the CPA	years	Technical specifications from the machinery supplier or the default life of the project as given in Tool to determine the remaining lifetime of equipment (Annex 15, EB 50) ²³
The period of assessment	years	The period of assessment shall be commercial lifetime of the solar park limited to 20 years ²⁴ in conformity with guidance 3 of Annex 5, EB 62
Depreciation rate	Ratio	South African Revenue Service
Salvage value -Land cost (if free hold) -Other assets	100.00% 5.00 %	International best practice
Income tax rate	%	South African revenue service, http://www.sars.gov.za/
ZAR exchange rate ²⁵	ZAR/Currency	Publically available data source at the time of decision making

Financial indicator calculation will conform to accepted accounting and financial management principles and relevant tax laws.

In South Africa, electricity prices for renewable energy projects are contractually determined by means of a Power Purchase Agreement (PPA). Two options are considered under this PoA.

²³ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-10-v1.pdf>

²⁴ Guidelines on the assessment of investment analysis, <http://cdm.unfccc.int/Reference/Guidclarif/index.html#pdd>

²⁵ The exchange rate will typically be required if the solar park equipment is imported. Any applicable currency may be applied, which will depend on information provided by the project participants.



1. **Government PPA:** In 08/2011, the Department of energy abandoned the Refit scheme in favour of a tender mechanism. Refit scheme was introduced in 03/2009 and guaranteed purchase prices (ZAR 3,940/MWh) and long term contracts of 20 years. However, the tariffs that had been established in 2009 were due to be significantly reduced (ZAR 2,311/kWh) at a review on 26/05/2011 before the programme was dissolved completely. Under tender mechanism bidders will have to propose tariff which will fall under technology dependent cap (ZAR 2,850/MWh has been fixed for solar power projects under this cap). The proposed prices should make a single adjustment on April 1 each year in line with expected decreasing costs. In selecting the bidders, 70.00% weight is given to financial aspects of the project and 30.00% to economic development which includes job creation, local content, ownership, management control, preferential procurement, enterprise development and socio economic development.
2. **Private PPA:** in this case the produced electricity will be sold to a grid connected entity (typically a municipality or other identified consumer) at a predetermined market price²⁶.

In either case, as the project developer would not have entered into PPA at the time of decision making, CPAs will use the latest NERSA average tariff as available in public domain conforming to guidance 6 of Annex 5, EB 62. However, the additionality of the project will also be demonstrated by considering the tariff at which the project envisages to bid, (which will take into consideration the latest bid tariff available to PP, the cost structure and the tariff expected to be quoted by other bidders) as a part of sensitivity analysis, as till the bid is submitted, accepted by the Department Energy and PPA signed, the PP could not be certain about the tariff.

The input parameters given in Table B.3-1 are exhaustive and no additional parameters will be included. Financial indicator calculation will conform to accepted accounting and financial management principles and relevant tax laws.

Outcome of Sub-step 2c (for each activity), if:

IRR of the activity \geq Benchmark	The CPA is economically feasible without the revenue from the sale of CERs. The CPA is not additional.
IRR of the activity $<$ Benchmark	The CPA is not economically feasible. This serves as a strong argument in favour of additionality. The CPA developer has to proceed to Sub-step 2d (Sensitivity analysis)

Sub-step 2d: Sensitivity analysis

The CPA developer will determine the reasonable range of variations for each parameter under the CPA in the project context.

In general sensitivity analysis will cover the range of +10.00% and -10.00%, unless it is not deemed appropriate in the context of the specific project circumstances.

After the reasonable variation has been established, the CPA developer will calculate IRR for the chosen range (for each input parameter) and compare it with the benchmark.

In general, the following variables will be considered for the analysis:

²⁶ This may include additional fees for the use of the national grid to transfer power.



- Investment cost; and
- Electricity tariff/Load factor of the solar park
- Tariff
- Operations and Maintenance (O&M) costs
- Administration cost

The results of the sensitivity analysis shall be displayed in table format as illustrated in Table B.3-2.

Table B.3-2: Sensitivity analysis of the IRR of the activity

Variable	Variation		
	-value%	0.00%	+value%
Electricity Price			
Load factor			
Investment Cost			
O&M Cost			
Administration cost			

In the sensitivity analysis all variables will be varied individually. If any one of the IRR values calculated in Table B.3-2 is higher than or equal to the benchmark, the activity will be deemed to be economically feasible without the sale of CERs, unless the CPA is able to establish, with documentary evidence that such escalation / reduction to the extent envisaged, is unlikely to occur.

Outcome of Sub-step 2d (for each activity), if:

Any one of the IRR values presented in Table E.5-2 for the activity \geq Benchmark	The investment analysis does not provide a valid argument in favour of additionality. The CPA is not additional.
All IRR values presented in Table E.5-2 for the activity $<$ Benchmark	The investment analysis provides a valid argument in favour of additionality. The CPA developer has to proceed to proceed to Step 4 (Common practice analysis).

Step 4: Common practice analysis

According to paragraph 13(b) and 57 of the Additionality Tool, the CME shall proceed to Sub-step 4a since each CPA under this PoA will fall under “power generation based on renewable energy”.

**Sub-step 4a: The proposed CDM project activity(ies) applies measure(s) that are listed in the definitions section of the Additionality Tool**

Common practice analysis will be demonstrated by each CPA in conformity with the stepwise approach in the “Guidelines on common practice” (Version 02.0), Annex 8, EB69²⁷. The data presented will be credible, reliable and authentic. Each CPA will conclusively demonstrate that the CPA is not a common practice in the selected geographical region.

Step 1: Calculate applicable output range as +/-50.00% of the design output or capacity of the proposed project activity;

Step 2: In the applicable geographical area, identify all plants that apply the same measure as the proposed CPA and deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity. At the same time the identified plants should have started commercial operation before the start date of the CPA or before the CPA is published for global stakeholder consultation.

Step 3: Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all} ;

Step 4: Within plants identified in Step 3, identify those that apply technologies different than the technology applied in the proposed project activity. Note their number N_{diff} ;

Step 5: Calculate factor $F=1-N_{diff}/N_{all}$, representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

The proposed project activity is a “common practice” within a sector in the applicable geographical area if both the following conditions are fulfilled:

- a) The factor F is greater than 0.2; and
- b) $N_{all}-N_{diff}$ is greater than 3.

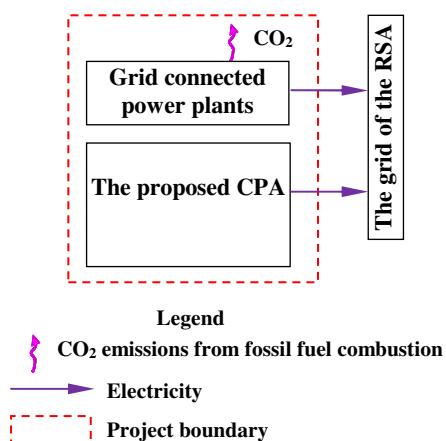
Outcome of Sub-step 4a: If:

There are no similar activities to the CPA in the RSA.	The proposed CPA is additional.
There are similar project activities to the CPA in the RSA.	The proposed CPA is not additional.

B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.

The spatial extent of the CPA boundary includes the proposed renewable energy power plant(s) and all power plants physically connected to the grid of the Republic of South Africa.

²⁷ http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid44.pdf this version of the tool will be used throughout this document

**Figure B.4-1: CPA boundary**

The greenhouse gases and emission sources that are included in or excluded from the CPA boundary are shown in Table B.4-1.

Table B.4-1: Emissions sources included in or excluded from the CPA boundary

<u>Source</u>		Gas	Included ?	Justification / Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the CPA	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission sources, which are not included in the baseline
		N ₂ O	No	
CPA	GHG emissions from the proposed CPA	CO ₂	Yes/No	Main emission source, will only be accounted for in case auxiliary fossil fuel is used. Or GHG emissions for solar power generation projects are equal to zero.
		CH ₄	No	Minor emission sources Or
		N ₂ O	No	GHG emissions for PV solar power generation projects are equal to zero.

CPA '###' is located within the boundaries of the Republic of South Africa as shown in Section A.4.1.2.

**B.5. Emission reductions:****B.5.1. Data and parameters that are available at validation:**

CPAs shall always apply the fixed parameters of the latest version of the PoA-DD. The following parameters are fixed for this CPAs during the first crediting period of the PoA:²⁸

Data / Parameter:	$EG_{m,y}$
Data unit:	MWh
Description:	Net quantity of electricity generated and delivered to the grid by power unit m in year y
Source of data used:	Eskom's statistic data
Value applied:	See Annex 3-3 of the PoA-DD
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics, publicly available and reliable data source
Any comment:	The data for the three most recent reporting years is provided.

Data / Parameter:	$FC_{i,m,y}$
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type i consumed by power unit m in year y
Source of data used:	Eskom's statistic data
Value applied:	See Annex 3-3 of the PoA-DD
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics, publicly available and reliable data source
Any comment:	The data for the three most recent reporting years is provided.

Data / Parameter:	$NCV_{coal,y}$
Data unit:	GJ/t
Description:	Net calorific value of Other Bituminous Coal
Source of data used:	2006 IPCC Guidelines for National GHG Inventories, volume 2: Energy, chapter 1, Table 1.2
Value applied:	19.9
Justification of the choice of data or	For the sake of a conservative approach the IPCC default value at the lower limit of the uncertainty at a 95.00% confidence interval is used.

²⁸ http://cdm.unfccc.int/EB/032/eb32_repan39.pdf



description of measurement methods and procedures actually applied :	
Any comment:	This value was appointed as a constant for the first crediting period of the CPA.

Data / Parameter:	$EF_{CO_2,coal,y}$
Data unit:	tCO ₂ /GJ
Description:	CO ₂ emission factor of Other Bituminous Coal
Source of data used:	2006 IPCC Guidelines for National GHG Inventories, volume 2: Energy, chapter 1, Table 1.4
Value applied:	0.0895
Justification of the choice of data or description of measurement methods and procedures actually applied :	For the sake of a conservative approach the IPCC default value at the lower limit of the uncertainty at a 95.00% confidence interval is used.
Any comment:	This value was appointed as a constant for the first crediting period of the CPA.

Data / Parameter:	$EF_{CO_2,NG,y}$
Data unit:	tCO ₂ /GJ
Description:	CO ₂ emission factor of Natural Gas
Source of data used:	2006 IPCC Guidelines for National GHG Inventories, volume 2: Energy, chapter 1, Table 1.4
Value applied:	0.0543
Justification of the choice of data or description of measurement methods and procedures actually applied :	For the sake of a conservative approach the IPCC default value at the lower limit of the uncertainty at a 95.00% confidence interval is used.
Any comment:	This value was appointed as a constant for the first crediting period of the CPA.

Data / Parameter:	η_{OCGT}
Data unit:	ratio
Description:	Average net energy conversion efficiency of open cycle gas turbine power plant
Source of data used:	Tool to calculate the emission factor for an electricity system, Annex 1 the first Table
Value applied:	0.395
Justification of the choice of data or description of	Default value is used



measurement methods and procedures actually applied :	
Any comment:	This value was appointed as a constant for the first crediting period of the CPA.

Data / Parameter:	$\eta_{m,y}$
Data unit:	ratio
Description:	Average net energy conversion efficiency of coal fired power plant that has operated for more than 10 years for calculation of the Build Margin.
Source of data used:	Tool to calculate the emission factor for an electricity system, Annex 1 the first Table
Value applied:	0.37
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value is used
Any comment:	This value was appointed as a constant to Majuba and Kendal power plants for the calculation of build margin CO ₂ emission factor (refer to Annex 3-5 of the PoA-DD).

Data / Parameter:	$EG_{n,y}$
Data unit:	MWh
Description:	Net quantity of electricity generated and delivered to the grid by power unit n in year y
Source of data used:	Eskom's statistic data
Value applied:	See Annex 3-4 of the PoA-DD
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics, publicly available and reliable data source
Any comment:	The data for 2010 reporting year is provided (the most recent data at the time of start of PoA validation).

Data / Parameter:	$FC_{i,n,y}$
Data unit:	mass or volume unit
Description:	Amount of fossil fuel type i consumed by power unit n in year y
Source of data used:	Eskom's statistic data
Value applied:	See Annex 3-4 of the PoA-DD
Justification of the choice of data or	Official statistics, publicly available and reliable data source



description of measurement methods and procedures actually applied :	
Any comment:	The data for 2010 reporting year is provided (the most recent data at the time of start of PoA validation).

Data / Parameter:	$EF_{grid,CM}$
Data unit:	tCO ₂ /MWh
Description:	Combined margin CO ₂ emission factor for grid connected power generation calculated ex ante
Source of data used:	CDM-PoA-DD
Value applied:	0.988
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated <i>ex ante</i> based on the “Tool to calculate the emission factor for an electricity system” (Version 03.0.0), from EB 70, Annex 22 ²⁹
Any comment:	This value was appointed as a constant for the first crediting period.

Data / Parameter:	P_y
Data unit:	MW
Description:	Power capacity of the CPA in year y
Source of data used:	‘Reference’
Value applied:	‘###’
Justification of the choice of data or description of measurement methods and procedures actually applied :	Evaluated by the solar park developer
Any comment:	The value reflects the expected maximum power output of the CPA.

B.5.2. Ex-ante calculation of emission reductions:

The total emission reductions of the CPA are calculated on the basis of the equations and parameters presented and explained in Section E.6 of the PoA-DD and B.5.1 of this document.

Emission reduction calculation

Emission reductions in year y are calculated as follows:

²⁹ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools> (this version of the tool will be applied throughout the document.)



$$ER_y = BE_y - PE_y \quad (E.5-1)$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr)

BE_y = Baseline emissions in year y (tCO₂/yr)

PE_y = CPA emissions in year y (tCO₂e/yr)

Or

$$ER_y = EG_{CPA,y} \times EF_{grid,CM} - \sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y} \quad (E.5-2)$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr)

$FC_{i,y}$ = The quantity of fuel type i combusted during the year y (mass or volume unit/yr)

$NCV_{i,y}$ = The weighted average net calorific value of the fuel type i in year y (GJ/mass or volume unit)

i = The fuel types combusted during the year y

$EF_{CO2,i,y}$ = The weighted average CO₂ emission factor of fuel type i in year y (tCO₂/GJ)

$EG_{CPA,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CPA in year y (MWh/yr)

$EF_{grid,CM}$ = Combined margin CO₂ emission factor for grid connected power generation calculated ex ante (tCO₂/MWh)

‘For PV technology specify that no auxiliary fossil fuel consumption will take place and conclude that $FC_{i,y}$ is equal to zero, thus the formula will be transformed into:

$$ER_y = EG_{CPA,y} \times EF_{grid,CM} \quad (B.5-3)$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr)

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

$EF_{grid,CM}$ = Combined margin CO₂ emission factor for grid connected power generation calculated ex ante (tCO₂/MWh)

Combined margin CO₂ emission factor for grid connected power generation calculated ex ante is fixed for all CPAs of the PoA (see Section E.6 of the PoA-DD) and equal to ‘###’ tCO₂/MWh.

‘For CPAs which employ CSP technology insert ex-ante parameter for $NCV_{i,y}$ and $EF_{CO2,i,y}$ ’

The summary of the ex-ante estimation of emission reductions is presented in Table below:



‘Remove or insert lines depending on the length of the crediting period; remove fossil fuel column for CPAs which employ PV technology’

Year	$FC_{i,y}$, ‘unit’	$EG_{\text{facility},y}$ (MWh/a)	PE_y (tCO ₂ /yr)	BE_y (tCO ₂ /yr)	ER_y (tCO ₂ /yr)
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’
‘###’	‘###’	‘###’	‘###’	‘###’	‘###’

‘Provide comments if required’ **B.5.3. Summary of the ex-ante estimation of emission reductions:**

Year	Estimation of project emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
‘Year 1’ (From ‘starting date of CPA’ to 31/12/ ‘Year 1’)	0		0	
‘Year 2’	0		0	
‘Year 3’	0		0	
‘Year 4’	0		0	
‘Year 5’	0		0	
‘Year 6’	0		0	
‘Year 7’	0		0	
‘Year 8’ (From 01/01/ ‘Year 8’ to ‘end of month preceding month of starting date of crediting period’) ³⁰	0		0	
‘Year 9 for fixed crediting period only’	0		0	

³⁰[NOTE: In the event that this is a renewable crediting period and the crediting period starts on 1st of January of ‘Year 1’ there will be no overlap between years. In this case ‘Year 8’ will be omitted.]



'Year 10 for fixed crediting period only'	0		0	
'Year 11' (From 'DD/MM/YYYY' to 'DD/MM/YYYY' (end of month preceding month of starting date of crediting period)) ³¹	0		0	
Total (tonnes of CO ₂ e)	0		0	

B.6. Application of the monitoring methodology and description of the monitoring plan:
B.6.1. Description of the monitoring plan:

The monitoring plan of CPA '###' is devised as per approved consolidated baseline and monitoring methodology ACM0002 (Version 12.3.0) "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"³².

For the sake of clarification on the operational and management structure also refer to The Management System for the South African Large Scale Grid Connected Solar Park Programme (Version 02) and Section A.4.4.1 and E.7.2.1 of the PoA-DD.

The following monitoring procedures shall be applied:

1. Monitoring period

The monitoring period starts from the date of commissioning of the CPA or the date of registration of the proposed CPA under the PoA (whichever is later).

2. Data monitored and sources

The CME will measure data and parameters as per identified parameters in the CPA like the quantity of net electricity generation that is produced and fed into the grid by the CPA in year y.

The quantity of net electricity generation that is produced and fed into the grid by the CPA in year y shall be determined on the basis of electricity meters. The generated electricity will be continuously measured and recorded at least on a monthly basis by the CPA personnel. The metering instruments shall be installed in accordance with the requirements of the Grid and the Distribution Metering Codes at the point of supply which defines the commercial boundary between the solar park owner and the grid (refer to Section 4 of SANS 474. Metering requirements, pages 4-7). The export electricity meter will be equipped with the check meter. Readings of the electricity meters shall be cross-checked with records for sold/purchased electricity. Data on electricity supply will be digitally archived and submitted to the CME.

'For CPAs which employ CSP technology the quantity of fuel type i combusted during the year y will be continuously measured and recorded at the end of the operation or on a monthly basis (whichever is earlier) by the CPA personnel. Data on fuel consumption will be digitally archived and submitted to the

³¹ NOTE: In the event that this is a fixed crediting period and the crediting period starts on 1st of January of 'Year 1' there will be no overlap between years. In this case 'Year 11' will be omitted.

³² <http://cdm.unfccc.int/methodologies/PAmethodologies/approved> (this version of the methodology will be applied throughout the document.)



CME. The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. The weighted average net calorific value of the fuel type *i* in year *y* and the weighted average CO₂ emission factor of fuel type *i* in year *y* used in CSP power plants will be determined based on 2006 IPCC Guidelines for National GHG Inventories.’

The sources of data for calculation of GHG emission reductions in the course of monitoring shall be the internal electricity billing reports of the solar parks.

3. The monitoring team

[Specify]

4. Data storage

All data collected as part of monitoring plan should be archived electronically and be kept at least for 2 years after the end of the crediting period.

5. Instrumentation calibration

[Specify]

6. Emergency situations

[Specify]

The parameter to be monitored is:

Data / Parameter:	$EG_{CPA,y}$
Data unit:	MWh
Description:	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CPA in year <i>y</i>
Source of data to be used:	On-site measurement by electricity meters, yielding the net electricity supplied to the grid of the RSA. Readings are cross-checked with records for sold/purchased electricity. Data from electricity meters are transferred to a metering database.
Value of data:	‘Electricity delivered in respective year by CPA’
Description of measurement methods and procedures to be applied:	Calculated as the difference between the measured quantities of the grid electricity export and the import from grid. The meters will be installed at the point of supply which defines the commercial boundary between Eskom and the CPA owner. The export electricity meter will be equipped with the check meter. The exported and imported electricity will be continuously measured and recorded monthly. Data will be digitally archived at least on a monthly basis. ‘The meter class will be CPA dependent.’



QA/QC procedures to be applied:	Electricity meters will be calibrated according to South African Bureau of Standards (SABS) ³³ (relevant industry standards in the RSA) which is in line with paragraph 8 of Annex 60 to EB52. Readings are cross-checked with records for sold/purchased electricity.
Any comment:	-

‘For the CPA which employs the CSP technology only:

Data / Parameter:	$FC_{i,y}$
Data unit:	Mass or volume unit/yr
Description:	The quantity of fuel type <i>i</i> combusted during the year <i>y</i>
Source of data to be used:	On-site measurements
Value of data:	Value
Description of measurement methods and procedures to be applied:	Measurement by means of mass or volume meters. The fuel consumption will be continuously measured and recorded at the end of the operation or on a monthly basis (whichever is earlier) by the CPA personnel. Data on fuel consumption will be digitally archived and submitted to the CME. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift) ‘The meter class will be CPA dependent.’
QA/QC procedures to be applied:	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.
Any comment:	On-site measurement of fossil fuel consumption is only applicable for CSP technology

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/mass or volume unit
Description:	The weighted average net calorific value of the fuel type <i>i</i> in year <i>y</i>
Source of data to be used:	2006 IPCC Guidelines for National GHG Inventories, volume 2: Energy, chapter 1, Table 1.2

³³ According to the SABS the SANS 474 regulation should be followed as per Table 5 on page 22 section 4.7.4.1.



Value of data:	Value
Description of measurement methods and procedures to be applied:	For the sake of a conservative approach the IPCC default value at the upper limit of the uncertainty at a 95.00% confidence interval should be used
QA/QC procedures to be applied:	-
Any comment:	NCV of fossil fuel used on-site will only be determined for CSP technology

Data / Parameter:	$EF_{CO_2,i,y}$
Data unit:	tCO ₂ /GJ
Description:	The weighted average CO ₂ emission factor of fuel type <i>i</i> in year <i>y</i>
Source of data to be used:	2006 IPCC Guidelines for National GHG Inventories, volume 2: Energy, chapter 1, Table 1.4
Value of data:	Value
Description of measurement methods and procedures to be applied:	For the sake of a conservative approach the IPCC default value at the upper limit of the uncertainty at a 95.00% confidence interval should be used
QA/QC procedures to be applied:	-
Any comment:	EF of fossil fuel used on-site will only be determined for CSP technology

**SECTION C. Environmental analysis**

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:

The environmental analysis is undertaken at the CPA level. The environmental impact of solar parks depends on the particular location, size, how the plant is embedded in its environment as well as its uptake in the local community.

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

‘Provide a summary of the findings of the environmental study³⁴’

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):

The National Environmental Management Act (NEMA) 107 of 1998, amended in 06/2010³⁵, governs Environmental Impact Assessment (EIA) and requires a scoping assessment and EIA or Basic Assessment (BA) depending on the capacity (or other characteristics) of the activity. The Act is to provide for co-operative, environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

The Listing Notices specify measures which cannot be started without environmental authorization from the competent authority. The localized impact of the proposed CPA needs to be assessed by Scoping assessment and EIA. The legislation regarding the electricity production is given below:

Notice	Description of activity involving electricity production	Effect
NEMA listing notice 1:	The construction of facilities or infrastructure for the generation of electricity where: (a) the electricity output is more than 10 megawatts but less than 20 megawatts; or (b) the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare.	Basic assessment is required
NEMA listing notice 2:	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.	Scoping assessment and EIA is required

³⁴ Reference the relevant Environmental Assessment document

³⁵ http://www.capegateway.gov.za/eng/pubs/public_info/N/200703

**SECTION D. Stakeholders' comments****D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

Stakeholder's comments are invited at CPA level. CPA specific information is required for assessing the environmental impact and therefore this process is conducted at CPA level. Since stakeholders comments forms part of the EIA process, it will therefore also be conducted at CPA level in order to include essential CPA specific information.

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

- 'Describe invitation procedure for public participation meeting, specify the date of advertisement for local stakeholder consultation invitation as well as meeting with the supporting evidences'
- 'List invitees'
- 'Description of meeting and how comments were compiled'

D.3. Summary of the comments received:

'Provide a summary of comments received'

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

'Provide a description of the assessment and follow up of comments'

**Annex 1****CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA**

Organization:	
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	



NAME /TITLE OF THE PoA: South African Large Scale Grid Connected Solar Park Programme



Annex 2

INFORMATION REGARDING PUBLIC FUNDING



Annex 3

BASELINE INFORMATION



NAME /TITLE OF THE PoA: South African Large Scale Grid Connected Solar Park Programme



CDM – Executive Board

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Annex 4

MONITORING INFORMATION

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**Appendix 1**

List of Abbreviations

BA	Basic Assessment
BM	Build Margin
BWC	Blue World Carbon Asset Management (Pty) Ltd
CA	Competent Authority
CERs	Certified Emission Reductions
CM	Combined Margin
CME	Coordinating and Managing Entity
CPA	CDM programme activity
DNA	Designated National Authority
EA	Environmental Authorization
EB	Executive Board
EIA	Environmental Impact Assessment
GHG	Greenhouse gas
IPPs	Independent Power Producers
IRR	Internal Rate of Return
NEMA	The National Environmental Management Act
NERSA	National Energy Regulator of South Africa
OM	Operating Margin
O&M	Operations and Maintenance
PoA	Programme of activities
PLF	Project Load Factor
REFIT	Renewable Energy Feed - In Tariff
PPA	Power Purchase Agreement
RSA	The Republic of South Africa
SABS	South African Bureau of Standards