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

CONTENTS

Annexes

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)

A.1. Title of the CPA:

(state name of CPA)
Version of CPA-DD: #
Date: DD/MM/YYYY

A.2. Description of the CPA:

>>
The proposed CPA will consist of ### (state number of WTGs) wind generation turbines (WTG) of capacity ### MW each. The total installed capacity of the proposed CPA is ### MW. The total gross power generation per machine is expected to be ### MWh/year, giving a gross annual energy production of the entire wind power park of ### GWh/year. The expected net electricity exported to the grid is ### GWh/year.

The proposed CPA will be located in the province of ### and the electricity generated by the project activity will be evacuated to the South African national electricity grid owned and operated by public utility company Eskom. Electricity in South Africa is heavily reliant on coal fired power plants; hence the CPA would result in reduction of greenhouse gas (GHG) emissions over a period of 20 years.

(Add any relevant additional information about the CPA)

A.3. Entity/individual responsible for CPA:

CPA Developer: ####
(hereafter referred as #### or "CPA Developer"),
Contact Details:
(State name of key contact person, as stated in Annex 1)

(State complete address, as stated in Annex 1)

Phone: ####
Email: ####
Web: ####

A.4. Technical description of the CPA:

The total installed capacity of the proposed ### (state name of CPA) is ### MW. The park will consist of ### (number of turbines) wind turbine generators (WTGs) ### (state turbine name / type) of capacity ### MW each. The gross annual electricity generation was estimated for the wind power project as ### MWh/year. This corresponds to an average gross annual energy production of ### MWh per WTG; with a corresponding gross plant load factor (PLF) ### %. The expected net electricity generation of the entire wind park amounts to ### MWh/year. The general details of the project are given in Table 1.

Table 1: General specifications of the WTG. Source: ### (Provide reference document)

Installed capacity	### (Fill table as appropriate)
Model of WTGs proposed	
Generator	
Rated power	
Rotor	
Rotor Diameter	
Swept area	
Other technical specifications	

There is electricity distribution infrastructure in proximity to the site which is designed for ### kilovolt (kV) distribution.

(State additional technical description as appropriate)

A.4.1. Identification of the CPA:

>>

A.4.1.1. Host Party:

Republic of South Africa

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

>>

The proposed site for the CPA is ###, near the town/city of ### in the province of ###.

Province	###
Municipality	###
Nearest city/large town	###
Geographical Coordinates	##° ##’ ##” and ##° ##’##”

Figure 1: Location of the proposed CPA

(Insert appropriate Map here)

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

DD/MM/YYYY (Insert the expected starting state of the CPA)

A.4.2.2. Expected operational lifetime of the CPA:

20 years

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

7 years x 3 (Renewable crediting period)

A.4.3.1. Starting date of the crediting period:

>>
DD/MM/YYYY

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

>>
7 years

NOTE: Please note that the duration of crediting period of any *CPA* shall be limited to the end date of the *PoA* regardless of when the CPA was added.

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

>>

Years	Annual estimation of emission reductions in tonnes of CO_2e
YYYY	####
YYYY	####
YYYY	####
YYYY	####
YYYY	####
YYYY	####
YYYY	####
Total estimated reductions (tonnes of CO_2e)	####
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	####

A.4.5. Public funding of the CPA:

>>
The CPA will not make use of any public funding or ODA.

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

>>

The PoA monitoring database maintained by the CME contains for each CPA the following information.

Name of the CPA	####
Name of the CPA developer ;	####
Contact details of the developer including contact person, address, telephone and email address	#### (Type address here) Contact person: #### (Name of Contact Person) Contact information: Work: #### Cell: #### Email: ####
Installed capacity and other relevant technical specifications of each CPA	#### (Provide a brief description of the installed capacity and number of WTGs)
Location of the CPA (e.g. GPS coordinates)	##° ##' ##" ##° ##'##"
Verification status and monitoring reports of each CPA	#### (State as appropriate)

Based on the data contained in the above table, the UNFCCC CDM database and South African DNA database of CDM projects[3] was crosschecked for identical projects and it is concluded that CPA is neither registered as an individual CDM project activity nor is part of another registered PoA.

[3] http://www.energy.gov.za/files/esources/kyoto/2012/CDM_Projects_Portfolio_19_June%202012.pdf

SECTION B. Eligibility of CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which CPA is added:

>>
'South Africa Wind Energy'
Version: 3.0 (Correct as per latest version of PoA-DD)
Date: 06/07/2012

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

>>
Table 2: Definition of eligibility criteria for inclusion of a project activity as a CPA under the PoA

General eligibility criteria for enrolling	Comments
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA, namely the Republic of South Africa. The CPA shall comply with the latest guidelines for inclusion as defined by the host country DNA.	### (Add a description of the location here)
(b) The CPA under the PoA is neither registered as an individual CDM project activity nor included in another registered CDM PoA.	### (Add a description to explain that the CPAs are unique)
(c) To avoid double counting of emission reductions each CPA-DD shall be uniquely identified and defined in an unambiguous manner by providing geographic information (e.g. coordinates), a unique CPA identification number, and the exact start date and end date of the crediting period. The following data must be provided to the CME prior to inclusion in the PoA: • Name of the CPA; • Name of the CPA developer • Contact details of the developer including contact person, address, telephone and email address • Installed capacity and other relevant technical specifications of each CPA; • Location of the CPA (e.g. GPS coordinates); • Unique Identification Number;	### (Add a description to explain that the CPAs are unique)

(d) Start date of the CPA shall be provided through documentary evidence and shall comply with latest CDM guidelines and standards. The start date is defined as the date when the CPA developer / owner makes a payment of 30% or more towards the purchase of wind turbines.	The start date of the CPA as per document ### (Provide name of document here) is DD/MM/YYYY
(e) Each CPA involves the construction and operation of a wind power project connected to the national/sub-national power grid.	The CPA is located in the province of ### in Republic of South Africa and the power shall be evacuated to the national electricity grid owned and operated by the national utility company, Eskom.
(f) The CPA needs to sign an inclusion agreement with the CME	### (Add note on inclusion agreement)
(g) Applicability conditions in version 12.3.0 of ACM0002: The methodology is not applicable to following: • Project activities that involve switching from fossil fuels to renewable energy at the site of the project activity • Biomass fired power plants • Hydro power plants that result in new reservoirs or in the increase in existing reservoirs where the power density of the power plant is less than 4 W/m^2	The CPA is a greenfield wind energy project.
(h) Only additional projects can be enrolled. Additionality is proven on the CPA level for each CPA separately.	The project proves additionality by using the investment analysis according to the "Tool for the demonstration and assessment of additionality".
(i) The CPAs must have undertaken an environmental analysis as per requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA) and CDM modalities and procedures as outlined in Section C.	### (Add a note on the EIA)
(j) The CPAs must have undertaken a local stakeholder consultation as outlined in Section D.	### (Add a note on the LSC)
(k) The CPAs must provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance.	### (Add a note on ODA)

(l) Only projects applying new energy generating equipment are eligible for inclusion. No equipment is transferred from another activity, located in a non-annex I party and no existing equipment is transferred from the project to another activity.	### (Add an affirmation here that energy generating equipment are all new and does not involve any transfer)

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

>>

As described in the POA-DD, the proposed CPA falls under the Sectoral Scope 1, 'Energy industries (renewable - / non-renewable sources)' and the additionality of the proposed CPA is demonstrated and assessed by the approved set of methodologies and tools:

Applied methodology:

- Version 12.3.0 of ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

Related tools:

- Version 2.2.1 of the "Tool to calculate the emission factor for an electricity system"
- Version 6.0.0 of the "Tool for the demonstration and assessment of additionality"

Identification of the baseline scenario

The baseline scenario for each CPA will be identified among the alternatives described in the methodology, ACM0002 version 12.3.0

The CPA 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".

Assessment and demonstration of additionality for the CPA

According to ACM0002, version 12.3.0., the additionality shall be demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality" agreed by the Board, which is available on the UNFCCC CDM website. Version 6.0.0 of the additionality tool includes the following steps:

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a*: *Define alternatives to the project activity

According to the CDM Validation and Verification Manual (EB 55 – Report – Annex 01 – Version 01.2 - clause 105), "the PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required" [4].

According to methodology ACM0002 version 12.3.0, in cases where the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is defined as follows:

> *"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"."*

Hence, in accordance with methodology ACM0002, version 12.3.0, and the "Tool to calculate the emission factor for an electricity system", version 2.2.1, baseline emissions are equal to power generated by the project activity and delivered to the grid, multiplied by the baseline emission factor. The baseline emission factor is equal to the combined margin (CM): a weighted average of the operating margin (OM) emission factor and the build margin (BM) emission factor. Therefore, no further analysis of the alternatives to the project activity is required.

Sub-step 1b: Consistency with mandatory laws and regulations

The alternative, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants, is in compliance with all existing applicable legal and regulatory requirements.

This step will determine whether the proposed project activity is economically and/or financially feasible, or not.

Step 2: Investment analysis

Sub-step 2a: Determine appropriate analysis method

Three options can be applied for the investment analysis: the simple cost analysis, the investment comparison and the benchmark analysis.

The latest version of the "*Tool for the demonstration and assessment of additionality"* states:

[4] http://cdm.unfccc.int/Reference/Manuals/accr_man01.pdf

"If the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III)".

The simple cost analysis is not applicable for the proposed project because the project activity will produce economic benefit other than the CDM related income, notably from electricity sale. Instead, the Benchmark Analysis (Option III) will be used.

Sub-step 2b: Option III. Apply benchmark analysis

(Provide a description on the benchmark has been determined for the CPA)

Hence the benchmark applied for the comparison with the financial indicator is ### %.

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

(Provide a description on calculation and comparison of financial indicators specific for the CPA)

Table #- Assumption parameters for the financial analysis

(Insert table of main assumptions)

(Add a conclusion of the financial analysis)

Project / equity IRR < Benchmark	Proceed with step 2d: Sensitivity analysis
Project / equity IRR > Benchmark	~~Proceed to step 3: Barrier analysis~~

(Strike of "Barrier Analysis" from above table if Barrier Analysis is not carried out)

Sub-step 2d: Sensitivity analysis

The objective of the sensitivity analysis is to quantify the impact of reasonable variations of critical variables in the financial indicator (e.g. IRR) of the proposed project activity:

According to the UNFCCC "Guidance on the Assessment of Investment Analysis" (version 5)[5] variables that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. The main variables considered in the sensitivity analysis are:

1. CAPEX
2. Feed-in tariff
3. Net electricity generated.

[5] http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf

The Guidance requires the financial analysis be performed by modifying each of the parameters by at least up to +/-10%, and assessing the impact on the financial indicator (without revenues from selling CERs). If the ### IRR for any of the above variables is above the benchmark, the activity is deemed to be economically feasible without the sale of CERs.

Sensitivity	-10%	0%	10%
CAPEX	##	##	##
Feed-in tariff	##	##	##
Net electricity	##	##	##

An analysis was carried out to determine the values for CAPEX, feed-in tariff and net electricity generation, where the project activity meets the benchmark. The CAPEX needs to be lowered by ## % than the current estimates for the project to meet the benchmark. (Include an explanation on why the benchmark cannot be met by the project under existing circumstances)

Similarly the feed-in tariff must be increased by ## % to ## ZAR/kWh for the project to meet the benchmark. (Include an explanation on why the benchmark cannot be met by changing the feed-in tariff under existing circumstances).

For the benchmark to be met the PLF needs to go up from ## % to ## %. (Include an explanation on why the new PLF cannot be met by the project under existing circumstances)

Considering revenues from CDM, the project IRR increases to ## %.

Step 3: Barrier Analysis

As the ### is lower than the benchmark, a barrier analysis is not required to be carried out.

Step 4. Common Practice Analysis

The common practice analysis has been carried based on the official Eskom database[6] that provides a list of all power plants currently operational in South Africa based on type of fuel and capacity.

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The proposed activity is considered at ## MW. The applicable output range at +/- 50% is defined as energy projects with an installed capacity ranging from ## MW to ## MW.

[6] Source: http://financialresults.co.za/2011/eskom_ar2011/fact_sheets_11.php
(Table 2: Power station commercial capacities at 31 March 2011

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;

The geographical area is defined as all regions in the republic of South Africa which is also the scope of the PoA. The table below proves a list of projects falling in the applicable output range:

Name of Project	Fuel / Technology Type	Capacity, MW
####	####	## MW

(Indicate if any of the above projects are CDM projects)

From the above table, it can be concluded that N_{all} = #

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

(Provide an explanation for Step 3), hence 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.

The proposed project activity is a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3.

F = 1-(## / ##)
F = #

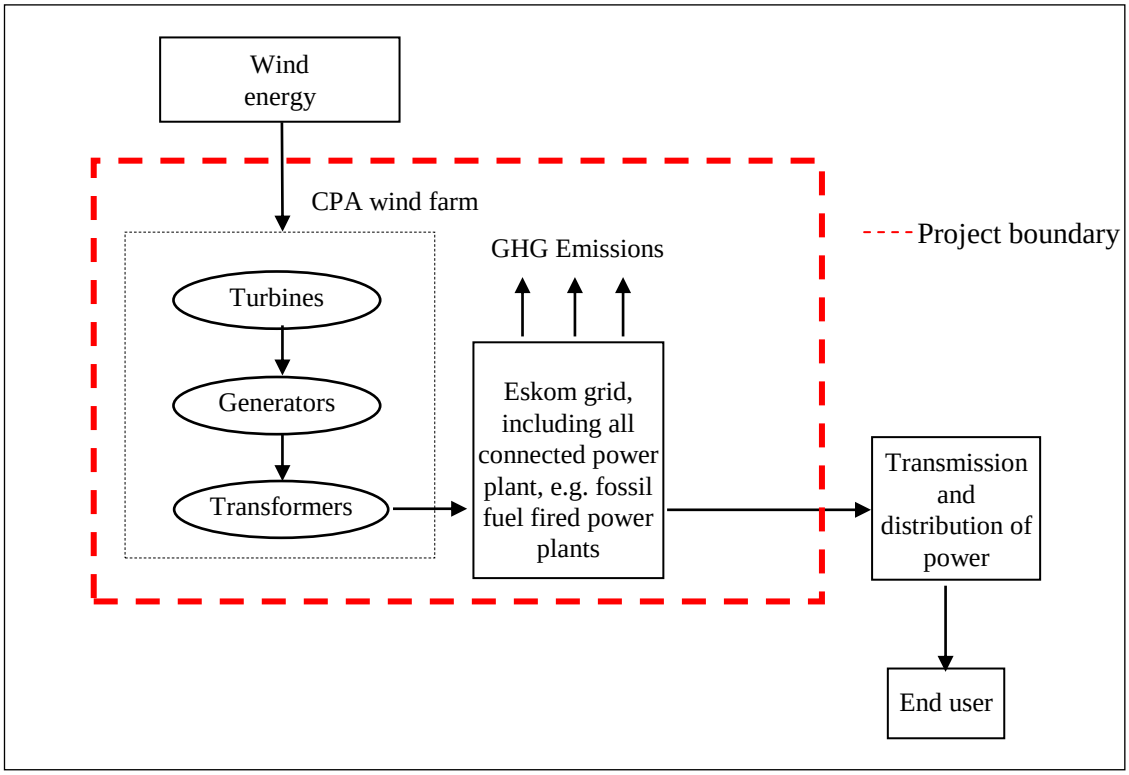
$N_{all}-N_{diff}$
= # - #
= #

As F is neither greater than 0.2 and $N_{all}-N_{diff}$ is less than 3, the proposed activity is not a common practice in South Africa.

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.

>>
According to version 12.3.0 of ACM0002, the spatial extent of the project boundary includes the project activity and all power plants connected physically to the same grid to which the proposed projects (CPAs) are also connected. There is presently one transmission electricity grid in South Africa that is owned and operated by the public utility company Eskom. The national grid spans all across the country.

Figure 2: Project boundary of the CPA



The GHGs and emission sources included in the project boundary are shown in the table below:

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
CPA	Wind power generation	CO_2	No	Minor emission source. As a zero emission grid connected wind power project no emissions will result.
		CH_4	No	Minor emission source. As a zero emission grid connected wind power project no emissions will result.
		N_2O	No	Minor emission source. As a zero emission grid connected wind power project no emissions will result.

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	**$EF_{grid,OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operating margin emission factor of the grid
Source of data used:	Calculated based on latest published data by utility, Eskom
Value applied:	####
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value is determined ex-ante and applied to the CM with a weighting of 0.75 for the first crediting period according to the "Tool to calculate the emission factor for an electricity system" (version 2..2.1). 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-DD to the DOE for validation/inclusion (*ex ante* option) according to the "Tool to calculate the emission factor for an electricity system" (version 2.2.1).
Any comment:	

Data / Parameter:	**$EF_{grid,BM,,y}$**
Data unit:	tCO_2/MWh
Description:	Build margin emission factor of the grid
Source of data used:	Calculated based on latest published data by utility, Eskom
Value applied:	####
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value is determined ex-ante and applied to the CM with a weighting of 0.25 for the first crediting period according to the "Tool to calculate the emission factor for an electricity system" (version 2.2.0).
Any comment:	

Data / Parameter:	**$EF_{grid,CM,,y}$**
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"
Source of data used:	Weighted average based on $\mathbf{EF}_{grid,OM,y}$ and $\mathbf{EF}_{grid,BM,,y}$
Value applied:	####
Justification of the choice of data or description of measurement methods and procedures actually applied :	This value is determined ex-ante and applied for the first crediting period according to the "Tool to calculate the emission factor for an electricity system" (version 2.2.0).
Any comment:	

Data / Parameter:	**$FC_{i,m,y}$ / $FC_{i,,y}$**
Data unit:	tons/year
Description:	Amount of fossil fuel type *i* consumed by power plant / unit *m* (or in the project electricity system in case of $FC_{i,y}$) in year y
Source of data used:	Published data by utility, Eskom
Value applied:	#### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##)
Justification of the choice of data or description of measurement methods and procedures actually applied :	• Simple OM, simple adjusted OM, average OM: 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-DD to the DOE for validation (*ex ante* option) • BM: For the first crediting period, once *ex ante*, following the guidance included in Step 5 of the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1). For the second and third crediting period, once *ex ante* at the start of the second crediting period.
Any comment:	The values denoted are the total sum values of all power plants. Fuel consumption of individual power plants for the respective vintage have been considered for calculation of the OM. See annex 3 for specific information.

Data / Parameter:	**$EG_{m,y}$ / EG_y**
Data unit:	MWh/yr
Description:	Net electricity generated and delivered to the grid by power plant/unit *m* (or in the project electricity system in case of EG_y) in year *y*
Source of data used:	Published data by utility, Eskom
Value applied:	#### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Simple OM, simple adjusted OM, average OM: 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-DD to the DOE for validation (*ex ante* option)
Any comment:	The values denoted are the total sum values of all power plants. Electricity generation of individual power plants for the respective vintage have been considered for calculation of the OM. See annex 3 for specific information.

Data / Parameter:	**$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$**
Data unit:	tCO_2/ton of fuel
Description:	CO_2 emission factor of fossil fuel type *i* used in power unit *m* in year *y*
Source of data used:	Published data by utility, Eskom
Value applied:	#### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##) #### (Vintage: 20## - 20##)

Justification of the choice of data or description of measurement methods and procedures actually applied :	• Simple OM, simple adjusted OM, average OM: 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-DD to the DOE for validation (*ex ante* option) • BM: For the first crediting period, once *ex ante*, following the guidance included in Step 5 of the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1). For the second and third crediting period, once *ex ante* at the start of the second crediting period.
Any comment:	The values denoted are the average values of all power plants for the respective vintage considered for calculation of the OM. See annex 3 for individual values considered for respective power plants.

Data / Parameter:	**$EF_{CO2,i,y}$ and $EF_{CO2,m,i,y}$**
Data unit:	tCO_2/TJ of natural gas
Description:	CO_2 emission factor of fossil fuel type *i* used in power unit *m* in year *y*
Source of data used:	IPCC data[7] / (Indicate source if different)
Value applied:	####
Justification of the choice of data or description of measurement methods and procedures actually applied :	• Simple OM, simple adjusted OM, average OM: 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-DD to the DOE for validation (*ex ante* option) • BM: For the first crediting period, once *ex ante*, following the guidance included in Step 5 of the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1). For the second and third crediting period, once *ex ante* at the start of the second crediting period.
Any comment:	This value is applicable for gas based power plants only. See annex 3 for more information.

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

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The emissions reductions are calculated in accordance with the approved consolidated baseline methodology version 12.3.0 of ACM0002 along with the "Tool to calculate the emission factor for an electricity system" (version 02.2.0), as follows:

Project emissions (PE_y)

For most renewable power generation project activities, incl. wind power, applies $PE_y = 0$.

Baseline emissions (BE_y)

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 methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

[7] Source: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf Pg 1.24.

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad \textbf{(1)}$$

Where:

BE_y	=	Baseline emissions in year y (tCO_2e/yr)
$EG_{PJ,y}$	=	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/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions. For this CPA methodology (a) is used.

(a) Greenfield renewable energy power plants

Since the typical CPA 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, $EG_{PJ,y}$ is calculated as follows:

$$EG_{PJ,y} = EG_{facility,y} \quad \textbf{(2)}$$

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/yr)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Calculation of $EF_{grid,CM,y}$

According to the "Tool to calculate the emission factor for an electricity system" (version 02.2.0) the baseline emission factor ($EF_{grid,CM,y}$) is calculated as combined margin (CM), consisting of the combination of the operating margin (OM) and the build margin (BM) factors. OM and BM are calculated ex-ante based on official data source as public available and will be fixed during the first crediting period. See calculation below and presented in Annex 3.

Application of procedures provided in "Tool to calculate the emission factor for an electricity system" (version 02.2.0) for determining the grid emission factor are as follows:

STEP 1. Identify the relevant electricity systems.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine the operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Calculate the build margin (BM) emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

Step 1: Identify the relevant electricity systems

For determining the electricity emission factors, a **project electricity system** is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints.

The South African grid is managed by a state-owned utility, Eskom, which is in charge of generation, transmission and distribution of electricity to end-users. Eskom dominates the electricity supply market, and only a few municipal and private generators exist. There is public information available for Eskom power plants, while for "private generators the information available is only partial and ends in 2005. It is considered to be acceptable that the Eskom represent the electricity production industry in South Africa, as it produces over 95% of electricity in South Africa. Only less than 5% comes from private and municipal generators.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

The option "Only grid power plants are included in the calculation" has been chosen and corresponds to the procedure contained in earlier versions of the tool.

Step 3: Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on option of Average OM.

For the Average OM the emissions factor is calculated using the following data vintage:

> • *Ex ante* option: If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission of the CDM-PDD for validation.

For the CPA the ex-ante data vintage 20## - 20##, 20## - 20##, 20## - 20## has been chosen and applied for the Simple OM calculation.

Step 4: Calculate the operating margin emission factor according to the selected method

(a) Average OM

Refer Annex 3 "Baseline Information" for information on how Average OM calculation was undertaken.

Step 5: Calculate the build margin (BM) emission factor

In terms of data vintage, there are two options according to "Tool to calculate the emission factor for an electricity system" (version 02.2.0):

Option 1: For the first crediting period, calculate the build margin emission factor *ex ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, *ex post*, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated *ex ante*, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 has been chosen. So the calculation of the Build Margin (BM) emission factor $EF_{grid,BM,y}$ *ex-ante* based on the most recent information available 20## - 20## on plants already built for sample group *m* at the time of CPA-DD submission has been carried out.

Refer Annex 3 "Baseline Information" for information on how the BM calculation was undertaken.

Step 6: Calculate the combined margin (CM) emissions factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on the following method: (a) Weighted average CM.

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM-adj,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$	= Build Margin CO_2 emission factor in year y (t CO_2/MWh)
$EF_{grid,OM,y}$	= Operating Margin CO_2 emission factor in year y (t CO_2/MWh)
w_{OM}	= Weighting of operating margin emissions factor (%)
w_{BM}	= Weighting of build margin emissions factor (%)

The following default values should be used for w_{OM} and w_{BM}: ("Tool to Calculate the Emission Factor for an Electricity System", Ver.2.1 (pg 14)

- Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.

As the CPA is a wind power generation project the weight applied to the operating and build margin emissions factors are w_{OM} = 0.75 and w_{BM} = 0.25 for calculating of the CM.

Operating Margin:

	20## - 20##	20## - 20##	20## - 20##	Average
EF, tCO_{2e}/MWh	####	####	####	####

Build Margin: #### tCO_{2e}/MWh

Combined Margin: = (0.75 * ####) + (0.25 * ####)
= ##### tCO_{2e}/MWh

Leakage (LE_y)
As it is stated in ACM0002 version 12.3.0 no leakage emissions are considered.

Emissions reduction (ER_y)
Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:
ER_y = Emission reductions in year *y* (t CO_2e/yr)
BE_y = Baseline emissions in year *y* (t CO_2e/yr)
PE_y = Project emissions in year *y* (t CO_2/yr)

B.5.3. Summary of the ex-ante estimation of emission reductions:

>>

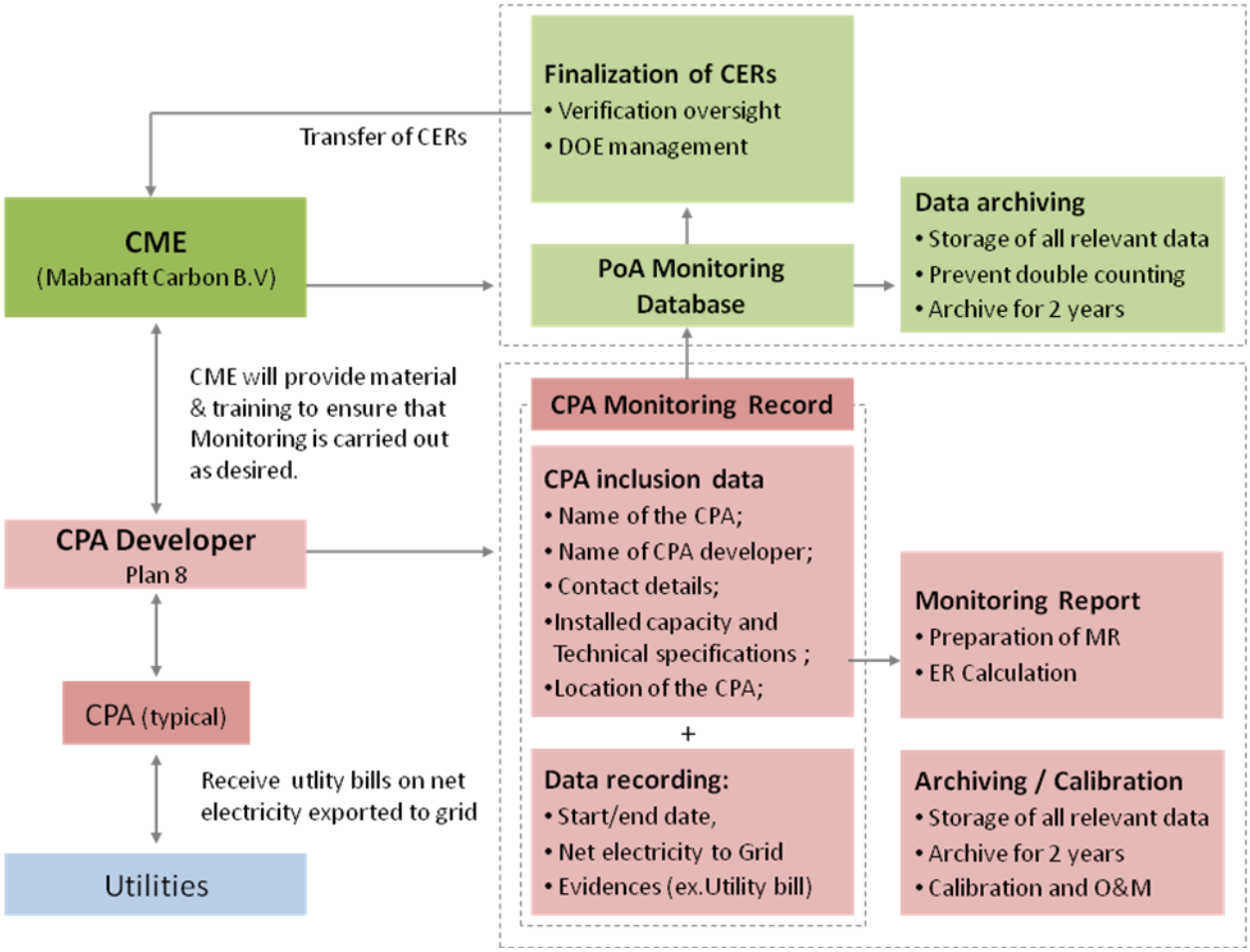
Year	Estimation of project activity emissions (tonnes CO_2e)	Estimation of baseline emissions (tonnes CO_2e)	Estimation of leakage (tonnes CO_2e)	Estimation of overall emission reductions (tonnes CO_2e)
YYYY	0	####	0	####
YYYY	0	####	0	####
YYYY	0	####	0	####
YYYY	0	####	0	####
YYYY	0	####	0	####
YYYY	0	####	0	####
YYYY	0	####	0	####
Total (tonnes of CO_2e)	0	####	0	####

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

B.6.1. Description of the monitoring plan:

>>

The purpose of the monitoring plan will be to measure and record the net electricity delivered to the electrical grid.



Management structure and responsibilities:

The CME will implement a monitoring protocol consolidating all individual monitoring reports allowing the Designated Operational Entity (DOE) to verify all CPAs in the PoA. Monitoring will be carried out by the CPA. The main measure for the PoA and CPA is the measurement of net electricity supplied to the grid and assuring the correct operation and maintenance of the measuring equipment.

Data collection

The CME will establish and maintain a PoA Monitoring Database for each and every CPA wherein the following data will be recorded:

Name of the CPA	####
Name of the CPA developer	####
Contact details of the developer including contact person, address, telephone and email address	####
Installed capacity and other relevant technical specifications of each CPA	####
Location of the CPA (e.g. GPS coordinates)	####
Verification status and monitoring reports of each CPA	####

The net energy generation data will be monitored directly at the CPA project site. Each CPA will comprise a single project activity, and hence the data will be monitored directly at that CPA project site. Monitoring will be carried out by each CPA developer and recorded in the CPA monitoring records. The CME will provide guidance to the CPA developer on how the monitoring should be conducted and data should be collected with regards to emission reduction calculations. The start and end dates of each monitoring period for each individual CPA, together with the CPA monitoring records to that monitoring period will be recorded in the PoA monitoring database.

Data recording

The net generation of the CPA, $EG_{facility,y}$, will be monitored by the CPA developer and recorded electronically. The CPA developer will provide the CPA monitoring records to the CME. The CME will document and store all data included in the CPA monitoring record provided by CPA developer in an electronic PoA monitoring database, while primary data will be stored by each CPA developer.

Data calibration

Data calibration will be done considering the calibration frequency as per manufacturer's requirements. The CME will store all the data in the PoA monitoring database. Primary data will be stored by the CPA developer.

Data reporting

The CPA developer will be responsible for the preparation of the monitoring report and the CME will be responsible communication with the DOE during verification activities. The monitoring report will compile all required monitoring information, in order to allow the DOE to verify the emission reductions for each monitoring period of each individual CPA. The monitoring report will unambiguously set out the data on emission reductions generation by each CPA during the monitoring period consistent with the requirements of this PoA-DD and the corresponding CPA-DD. Record keeping procedures for the PoA monitoring database undertaken by the CME will ensure that the data attributed to a monitoring period can be clearly attributed to an individual CPA and will furthermore prevent double counting of emission reduction data.

Data archiving

The CME will be responsible for the management of all CPA monitoring records associated with each CPA and the consolidated PoA monitoring database comprising of CPA specific data. All CPA monitoring records will be stored for a period of two years after the end of the relevant crediting period of the CPA.

The CPA developer is responsible to keep a copy of the raw monitored data and the CPA monitoring record also for a period of two years after the end of the relevant crediting period of the CPA.

Parameter to be monitored:

Data / Parameter:	**$EG_{facility,y}$ / $EG_{PJ,y}$**
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data to be used:	Project activity site: Direct, physical measurements as recorded by metering equipment (electricity meter) at CPA project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	####
Description of measurement methods and procedures to be applied:	Direct, physical measurements as recorded by metering equipment (electricity meter). Continuous measurement and at least monthly recording.
QA/QC procedures to be applied:	Meters shall be calibrated periodically according to local standards. The calibration shall take place at least every 2 years. Generation data of the CPA shall be cross checked to ensure data reliability.
Any comment:	

Data quality control
The data on $EG_{facility,y}$ and reports provided by the CPA developer to the CME will be checked internally to ensure the accuracy and completeness of data. In case of mistakes, corrective action will be applied to avoid future similar mistakes.

Training and monitoring personnel

The CME will ensure 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.

Leakage
No leakage emissions are considered.

SECTION C. Environmental analysis

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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:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

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

(State name of agency) has been appointed to undertake the requisite Environmental Impact Assessment (EIA) process as required in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA).

(Provide a description of documentation available)

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),:

Environmental Impact Assessment (EIA) process is required in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA).

(Provide additional description if appropriate)

SECTION D. Stakeholders' comments

>>

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

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

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

>>

The LSC was held at the #### (provide the location, address where the LSC was undertaken) at HH:MM Central African Time on DD/MM/YYYY and conducted by #### (Name of the agency).

(Add additional description as appropriate)

D.3. Summary of the comments received:

>>

(Add additional description as appropriate)

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

>>

(Add additional description as appropriate)

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:	####

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The CPA will not make use of any public funding or ODA.

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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