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

CONTENTS

Annexes

NOTE:

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

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

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

A.1 Title of the programme of activities:

South Africa Wind Energy
Version of PoA-DD: 3
Date: 06/07/2012

A.2. Description of the programme of activities:

>> Here the following information will be included

1. General operating and implementing framework of PoA

South Africa is the most industrialized country in Africa, with a population of about 50 million[1] people by 2011. Its economy is highly dependent on energy production and use, making it one of the largest emitters of greenhouse gases in the world. Coal provides 75% of the fossil fuel demand and accounts for 91% of electricity generation[2]. The bulk of GHG emissions in South Africa come from the energy sector, with the sector contributing more than 90% of carbon dioxide emissions[2].

South Africa's economy is structured around large-scale, energy-intensive mining and mineral industries, pushing its energy intensity to above average levels, with only 10 other countries having higher commercial primary energy intensities[3]. The need for massive investment in generating capacity to address the power shortage is expected to have a sharp impact on energy prices and dislodge South Africa from its position of being one of lowest-cost power producers in the world today[4].

For future sustainable energy supply, in 2003 the government published the 'White Paper on Energy Policy'[5] namely to "ensure security of supply through diversity". The government has expressed its intention to examine all available energy technologies, and plan for future electricity capacity needs based on planning to select the "least-cost option" [2]. Major options for electricity supply increase include fossil fuel based options (ex. de-mothballing of coal-fired power stations, new pulverised fuel plants, fluidised bed combustion, open cycle gas turbines (for peak generation), and combined cycle gas turbines). The government is also willing to explore various renewable energy technologies, including wind, solar thermal electricity, biomass and landfill gas.

2. Policy/measure or stated goal of the PoA

The objective of the South Africa Wind Energy PoA is to increase the supply of renewable energy to the South African national grid from renewable wind energy resources on a commercially sustainable basis. Given the Government's focus on "least cost option", large scale installations of wind energy projects in South Africa face several barriers. This is primarily due to the fact that currently there is no manufacturing of wind turbines in South Africa and potential developers of wind farms require to import entire turbines from Europe or Asia. At this point of time there are no known large scale installations of

[1] Source: http://www.southafrica.info/about/people/population.htm
[2] Source: http://www.erc.uct.ac.za/Research/publications/07Mwakasonda_LowCarbonScenario.pdf
[3] Source: http://www.eia.doe.gov/cabs/South_Africa/Background.html
[4] Source: http://www.energy.gov.za/files/media/explained/2009%20Digest%20PDF%20version.pdf
[5] Source: RSA Policy document: http://www.energy.gov.za/files/policies/whitepaper_renewables_2003.pdf

wind projects in South Africa and this PoA aims to facilitate easier entrance for carbon financing of wind energy projects in South Africa. As per the decision of the European Parliament, PoAs registered prior to 2013 will be liable to be traded at the EU-ETS up to 2020. The PoA will provide a platform for wind energy project developers (CPA developers) to overcome existing barriers through additional cash-flow from carbon revenues. The CME, Mabanaft Carbon B.V, intends to implement the PoA prior to the 2013 deadline. While providing such a platform for potential CPAs, the CME will take care of the CDM cycle development of the project activity and receive a certain return from CERs generated from the CPAs for its efforts.

All CPAs within the PoA will consist of Greenfield wind energy facilities. The electricity generated from the wind farms will be evacuated to the national grid either directly or through local municipalities or private parties. By replacing electricity from fossil fuel based power plants, this project will directly contribute to reduce greenhouse gas (GHG) emissions.

The proposed PoA will improve energy security avoiding the use of fossil fuels and the consequent pollutant emissions and hence, promoting South Africa's sustainable development. Moreover, the success of this project can be replicated, opening new business and social upliftment opportunities and increasing renewable energy share.

So far, the use of wind energy remains embryonic in the country; the proposed PoA will provide a key incentive to further boost the development of wind energy projects in South Africa.

The PoA will promote the development of wind energy in South Africa, which will result in the reduction of emissions of NO_x, SO_x, particles, soot, et cetera, since the electricity produced by the wind energy projects will replace predominantly coal fired electricity production.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

The proposed PoA is a voluntary action by Mabanaft Carbon B.V, The Netherlands and has not been established due to any existing policy or regulation by the government of South Africa. The company would not be developing this initiative if there will be no potential for future carbon cash flow.

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

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

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants(*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
The Netherlands	Coordinating and managing entity (CME) of the PoA: Mabanaft Carbon B.V.	No
(*) In accordance with the CDM modalities and procedures, at the time of making the PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

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

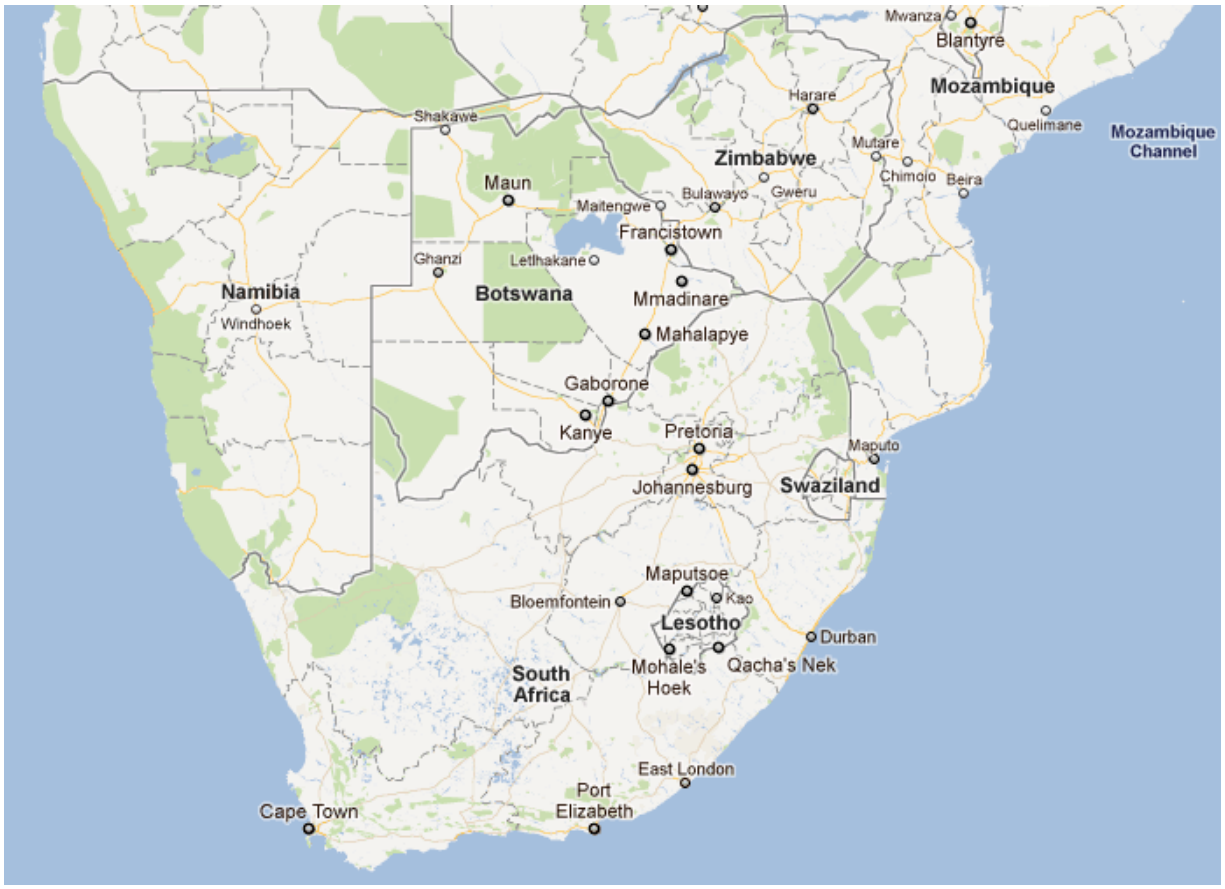
A.4.1. Location of the programme of activities:

A.4.1.1. Host Party(ies):

Republic of South Africa

A.4.1.2. Physical/ Geographical boundary:

All CDM programme activities (CPAs) included in the PoA will be implemented within the territorial area of the Republic of South Africa. Other adjacent and sub-Saharan countries might be included in the PoA post-registration. [6]



[6] The boundary of the programme can be amended post-registration to include an additional Host Party with the following three documents [EB60 Annex 26 para6]. 1) The existing registered PoA-DD is revised to reflect the changes, in the eligibility criteria of CPA; 2) DOE confirms that the baseline established in the PoA-DD is applicable to the extended programme boundary; 3) The DNA of new Host Party issues a letter of approval for the programme and a letter of authorization for the CME

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

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

A typical CPA under this PoA will be a wind energy plant/park with standard technology employed. CPAs should be connected to the national/sub-national grid. The boundary of the PoA is currently the host country South Africa. Other adjacent and sub-Saharan countries might be included in the PoA post-registration. If the geographical boundaries are extended to include additional countries, they will be in compliance with UNFCCC approved documentation (EB 60, Annex 26) [4]

Even though the detailed technical characteristics might differ per CPA the following general conditions will apply to all CPAs.

- CPAs are wind turbine farms which use wind energy converted with help of large wind turbine generators (WTG) into electricity which is supplied to the national grid/sub-national grid
- The PoA will be open to all technology providers and projects that meet the eligibility criteria of this PoA.
- A CPA under this PoA may be a single plant or a cluster of such plants employing the same technology undertaken by the same CPA developer or project community.

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

CPAs under the PoA are required to fulfil a range of criteria for inclusion with regards to environmental, regulatory, financial and program specific eligibility criteria considering the 'STANDARD FOR THE DEVELOPMENT OF ELIGIBILITY CRITERIA FOR THE INCLUSION OF A PROJECT ACTIVITY AS A CPA UNDER THE POA', EB 65, Annex 3, Version 01.0.

Table 1: Definition of eligibility criteria for inclusion of a project activity as a CPA under the PoA:

General eligibility criteria for inclusion of a CPA in the PoA
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA. The boundary of the PoA is the host country South Africa. Other adjacent and sub-Saharan countries might be included in the PoA post-registration. If these countries are included, necessary evidence noting their inclusion will be duly noted in the applicable CPA-PDD and the geographical boundary of the PoA will be expanded to include the expanded geographical boundary set. (Also refer section 4.1.2) The CPA shall comply with the latest guidelines for inclusion as defined by the host country DNA.
(b) The CPAs under its PoA are a voluntary action and neither registered as an individual CDM project activity nor included in another registered CDM PoA.
(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), CPA specific data, 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 CPA developer including contact person, address, telephone and/or email address;
- Installed capacity and other relevant technical specifications of each CPA;
- Location of the CPA (e.g. GPS coordinates);
- Unique Identification Number;

(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.

(e) Each CPA involves the construction and operation of a wind power project connected to the national/sub-national power grid, either directly or via local municipalities or private companies involved with transporting power.

(f) The CPAs need to sign an inclusion agreement with the CME

(g) Each CPA must be applicable to and need to apply the CDM baseline and monitoring methodology 'ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources' Version 12.3.0. The following applicability conditions apply:

Applicability conditions in version 12.3.0 of ACM0002
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: wind power plant/unit […]
The methodology is not applicable to the 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

(h) Only additional projects can be enrolled. Additionality is proven on the CPA level for each CPA separately.

(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.

(j) The CPAs must have undertaken a local stakeholder consultation as outlined in Section D.

(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.

(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.

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

(i) The proposed PoA is a voluntary coordinated action

The proposed PoA is a voluntary action by the CME. The CME as the key project participant with the implementation of the PoA intends to facilitate the access to CDM revenues to wind energy developers and to build an easier entrance for carbon financing for wind energy project in South Africa. When providing such a platform for potential CPAs the CME is taking care of the development of the CDM cycle related tasks of the project activity and will receive a certain return from CERs generated from the CPAs.

(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA

The PoA is a voluntary coordinated action by the CME allowing conditional participation of CPAs. The CME is developing and coordinating the PoA due to the expected CER revenues from the underlying CPAs. The voluntary coordinated action would not be implemented by the CME in the absence of the PoA. Additionality has to be proven on the CPA level for each CPA separately following the CDM baseline and monitoring methodology "ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources" Version 12.3.0 together with the relevant corresponding tools.

For most CPA cases additionality will be proven based on the latest version of the UNFCCC "Tool for the demonstration and assessment of additionality" (Version 6.0.0). An investment analysis will be carried out to demonstrate that the proposed CPAs are not the most economically or financially attractive choice of investment. The aspects are discussed in sections E.5.1 and E.5.2 of this document.

Moreover, due to the fact that there is currently no wind farm of commercial scale operating in South Africa[7], the project faces the following technological barriers:

- Lack of skilled and/or properly trained labour to operate and maintain the technology;
- Lack of infrastructure for implementation and logistics for maintenance of the wind power technology;
- Risk of technological failure: the wind technology failure risk in the local circumstances is significantly greater than for other technologies that provide services or outputs comparable to those of the proposed CDM-PoA project activity, as demonstrated by relevant scientific literature or technology manufacturer information.
- Uncertainty in regards to the electricity purchase price and conditions.

On the basis of the high risk factors listed above, CPA developers would not build the projects without the financial incentive of the CDM.

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

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced

Not applicable since there is no mandatory policy/regulation in connection with this PoA.

(iv) If mandatory a policy/regulation are enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

Not applicable since there is no mandatory policy/regulation in connection with this PoA.

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

A.4.4.1. Operational and management plan:

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

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

The CME will operate a PoA monitoring database including the CPAs for the PoA. Each CPA will be uniquely identified within the PoA monitoring database of all CPAs. According to the eligibility criteria the following data must be provided to the CME prior to inclusion in the PoA:

Basic data for inclusion	• Name of the CPA; • Name of the CPA developer ; • Contact details of the developer including contact person, address, telephone and/or email address; • Installed capacity and other relevant technical specifications of each CPA; • Location of the CPA (e.g. GPS coordinates);
Data during crediting period	• Verification status, CPA monitoring records and monitoring reports of each CPA.

The basic data for inclusion listed above will be provided by each CPA developer prior to inclusion. The CPA developer will record the required monitoring data (CPA monitoring records) and will ensure that the CPA monitoring records are made available to the CME. The CME will be responsible for the management of the PoA monitoring database, consisting of the basic data for inclusion and of all CPA monitoring records. All records will be stored for a period of two years after the end of the relevant crediting period. Relevant data capture, verification and storage procedures will be followed in maintaining the data to ensure its accuracy, validity and completeness.

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

Each CPA shall be uniquely identified within the PoA monitoring database described in (i) above. The geographical boundary for the PoA is limited by the borders of the host country eligibly under this PoA. The PoA monitoring database will report and contain the physical location of each CPA.

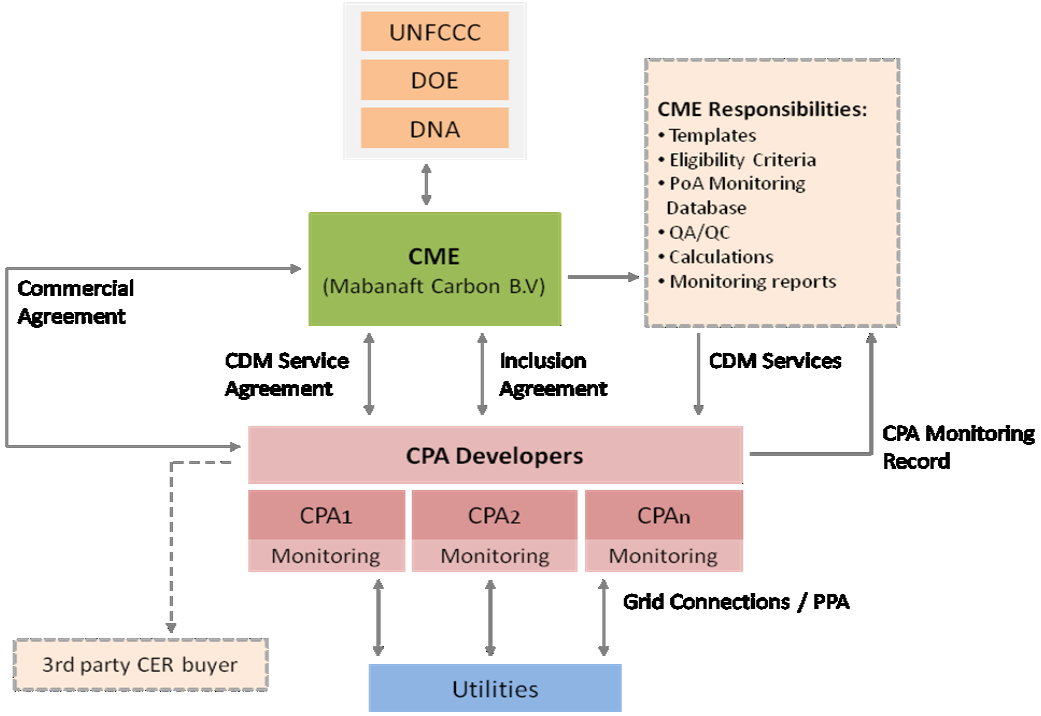
Prior to inclusion of a new CPA within the proposed PoA, the CME will check the UNFCCC CDM project database to verify whether a CDM project activity or CPA of another PoA for grid-connected

wind power generation has already been registered within the host country. In an instance where a CPA of another PoA or CDM project activity is already registered, the CME will ensure through cross-checking the PoA monitoring database of the other CPA or CDM project that there is no double counting of the individual CPA for this PoA.

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

Mabanaft Carbon B.V. as the CME will be involved in the implementation phase of the PoA and in the monitoring, however CPA developers will be in charge of monitoring the parameters for the CPA and providing monitoring reports to CME. The CME will interact with the regulatory bodies, e.g. UNFCCC, DOEs and DNAs and provide CDM services and necessary documentation to the CPA developers. The CME will agree with the CPA developer on a commercial/inclusion agreement. The commercial agreement will, inter alia, define the ownership of CERs. The following figure illustrates the general business model of the PoA.

Figure 1: Illustration of PoA's business model



A.4.4.2. Monitoring plan:

>> Here the following information will be provided:

(i) Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.

The PoA implementing wind energy projects is applying the monitoring methodology ACM0002 that does not use statistical sampling. All CPAs will be monitored and verified.

(ii) In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;

The CME will implement a monitoring protocol that allows the Designated Operational Entity (DOE) to verify all CPAs in the PoA. As described previously a PoA Monitoring database will be established that contains all the CPA specific data required to identify and locate each CPA. Each CPA will comprise a single project activity, and hence the data will be monitored directly and submitted to the CME.

Monitoring will be carried out by each CPA developer. For each CPA, all parameters included in E.7.1 will be monitored and recorded in the CPA monitoring records by the CPA developer according to the procedures established in E.7.2. Each CPA is responsible to appropriately measure the net electricity supplied to the grid and assuring the correct operation and maintenance of the measuring equipment. This will be done by respecting the calibration frequency as per methodology ACM0002, e.g. the manufacturer's requirements. The CME will store all the data submitted by the CPA developer in an electronic database (PoA monitoring database). Primary data will be stored by the developer as back-up.

Verification initiated by the CME will occur either separately for each CPA or for several CPAs at the same time. The CME will be typically responsible for the preparation of the monitoring reports, based on the CPA monitoring records using the monitoring report form, and communication with the DOE during verification activities. However CPA developers can opt to develop the Monitoring Reports based on the nature of the commercial agreement with the CME. The monitoring reports will aggregate all required monitoring information, i.e. CPA monitoring records, in order to allow the DOE to verify the emission reductions for each monitoring period of each CPA. Each 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. The use of the PoA monitoring database of CPA information and QA/QC procedures will ensure that double counting is not possible.

The start and end date of each monitoring period for each individual CPA, together with the CPA monitoring records attributable to that monitoring period will be recorded in the PoA monitoring database. Record keeping procedures undertaken by the CME will ensure that the CPA monitoring records attributed to a monitoring period can be clearly attributed to an individual CPA and will furthermore prevent double counting of emission reduction data.

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

- CPA developer will implement each CPA individually and monitor and record all parameters included in section E.7.1 (CPA monitoring record).
- 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 CPA developer will provide data on monitored parameters included in section E.7.1, required calculations, if any, and any documentary evidence to the CME.

- The CME will document and store all data related to parameters included in section E.7.1 provided by CPA developer in a central electronic database (PoA monitoring database) , while primary data will be stored by each CPA developer. The data for each CPA will be kept for at least two years after the end of the last crediting period for the CPA.
- The CME will review relevant CPA monitoring records, prepare the monitoring report, and provide the monitoring report to the DOE.

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

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The proposed PoA will not receive any public funds resulting from official development assistance from Parties included in Annex I to the Convention.

SECTION B. Duration of the programme of activities

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

Intended starting date 30 September 2012 or the date of registration (whichever is the latest).

B.2. Length of the programme of activities:

28 years

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

>>

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

The PoA consists of individual wind energy project activities potentially implemented in different geographical regions throughout the boundary of the PoA. Hence it is deemed inappropriate to conduct an environmental impact assessment at the PoA level. The type and size of CPA activity and the regional/national requirements will determine whether or not a full scale EIA process will be required.

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

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The EIA or environmental analysis as required by the host country will be done at a CPA level. All CPAs within the PoA will consist of wind energy facilities. By replacing electricity from fossil fuel based power plants, these projects will directly contribute to reduce greenhouse gas (GHG) emissions. The positive environmental benefits of the implemented CPAs at a PoA level may include:

- Decreased air pollution linked to the use of the fossil fuels;
- Displacement of fossil fuels and GHG emission reductions; and
- Decreased dependency on fossil fuels.

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),:

>>

National Environmental Management Act, No. 107 of 1998[8] (NEMA), as amended, establishes the principles for decision-making on matters affecting the environment. Section 2 sets out the National Environmental Management Principles which apply to the actions of organs of state that may significantly affect the environment. Furthermore, Section 28(1) states that "every person who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such pollution cannot be prevented then appropriate measures must be taken to minimise or rectify such pollution.

In terms of the NEMA, the proposed PoA triggers a suite of activities, which require authorisation from the competent environmental authority before they can be undertaken. As these proposed projects trigger a number of listed activities in terms of NEMA, it accordingly requires environmental authorisation. Since the CPAs are for the generation of energy, and energy projects are dealt with by the national authority, the competent authority is the national Department of Environmental Affairs (DEA).

[8] Source: http://www.info.gov.za/view/DownloadFileAction?id=70641

SECTION D. Stakeholders' comments

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

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

Each CPA operates within a geographically defined boundary and within the host country(-ies). For this reason local stakeholder consultation is done on a CPA level to ensure that the stakeholders actually affected by the project activity are adequately informed and consulted.

Note: If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.

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

>>

Local Stakeholder consultation is performed at CPA level.

D.3. Summary of the comments received:

>>

n.a.

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

>>

n.a.

SECTION E. Application of a baseline and monitoring methodology

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

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

>>

The South Africa Wind Energy PoA and subsequent CPAs satisfy the Sectoral Scope 1, 'Energy industries (renewable - / non-renewable sources)' and approved consolidated baseline and monitoring methodology ACM0002 version 12.3.0, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", is applied to each CPA included in the PoA.

Applied methodology:

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

Related tools:

- Tool to calculate the emission factor for an electricity system, version 2,2,1
- Tool for the demonstration and assessment of additionality, version 6.0.0
- Combined tool to identify the baseline scenario and demonstrate additionality (not relevant for the PoA), version 4.0.0
- Standard for demonstration of additionality, development of additionality criteria and application of multiple methodologies for program of activities, version 1.0

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

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The CPAs included in the PoA are grid-connected wind power project. Version 12.3.0 of ACM0002 methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s). The CPAs to be included in this PoA are Greenfield projects (option 'a'). More details of the comparison of the project's characteristics and the applicability criteria as specified in version 12.3.0 of ACM0002 are given in Table 2.

Table 2: Comparison of CPAs' characteristics and eligibility criteria of version 12.3.0 of ACM0002

Applicability conditions in version 12.3.0 of ACM0002	Characteristics of the project activity	Applicability criterion met?
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: wind power plant/unit […]	The CPA will consist of a wind power generation project that is grid-connected and falls under option (a) Greenfield projects.	Applicable
In the case of capacity additions, retrofits or	The CPA will consist of a wind	Not

replacements (except for wind, solar, wave or tidal power capacity addition projects which use Option 2 […] to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	power generation project that is grid-connected and falls under option (a) mentioned above.	Applicable
In the case of retrofits, replacements, or capacity additions, the methodology is only applicable if the most plausible baseline scenario is P2: "The continuation of the current situation, i.e. to use all power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance."	The CPA will consist of a wind power generation project that is grid-connected and falls under option (a) mentioned above.	Not Applicable
In case of hydro power plants, one of the following conditions must apply: • The project activity is implemented in an existing reservoir, with no change in the volume of reservoir • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density (installed power generation capacity divided by the surface area at full reservoir level) of the project activity, is greater than 4 W/m^2 • The project results in new reservoirs and the power density of the power plant is greater than 4 W/m^2	The CPA will consist of a wind power generation project that is grid-connected.	Not Applicable
The methodology is not applicable to the 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 renewable energy project, wind power projects, with no fuel-switch involved.	Not Applicable

This comparison shows clearly that version 12.3.0 of ACM0002 is applicable to the proposed PoA and all CPAs to be included.

In the following the procedures of ACM0002, version 12.3.0, are described considering the latest version of related tools, which are:

- 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"

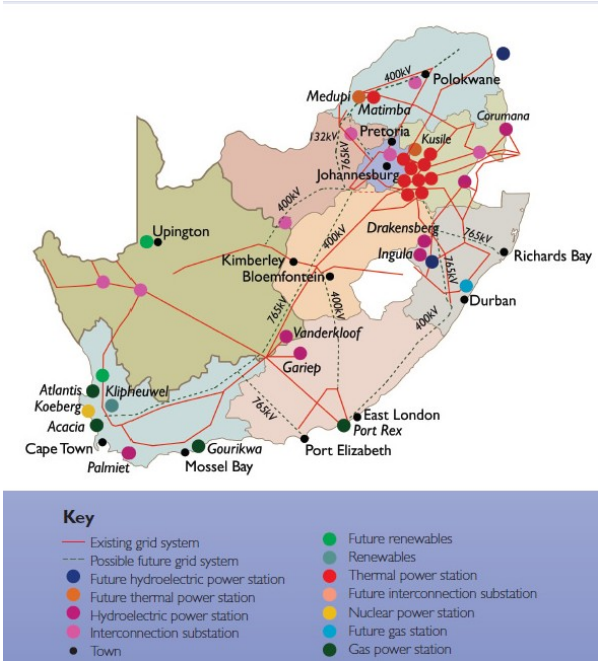
E.3. Description of the sources and gases included in the CPA boundary

>>

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 only one transmission company in South Africa, state owned Eskom Transmission that operates, maintains and administers the national grid.

The national grid spans all across the country (Figure 2). The transmission network consists of 28 790km of transmission lines of voltages ranging between 132 to 765kV and a network of 160 substations.

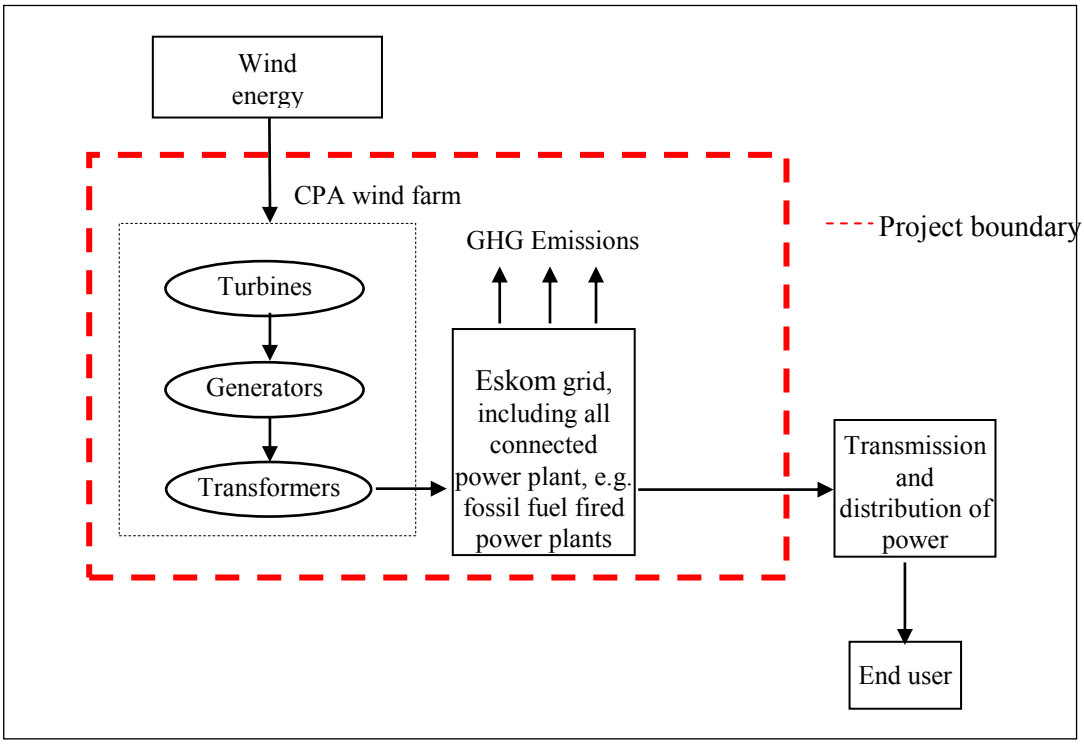
Figure 2: South African power network (Source: Eskom[9])



The flow diagram of the of a typical CPA boundary is shown in Figure 3.

[9] http://financialresults.co.za/2011/eskom_ar2011/profile_nature02.php#01

Figure 3: Project boundary of typical CPAs



The GHGs and emission sources included in the project boundary are shown in Table 3.

Table 3- Sources and gases included in or excluded from the project boundary

Source		Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project activity	Wind energy projects under the PoA	CO_2	No	Minor emission source. As a zero emission grid connected wind power project no emissions will result.
		CH_4	No	As a zero emission grid connected wind power project no emissions will result.
		N_2O	No	As a zero emission grid connected wind power project no emissions will result.

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

>>

Identification of the baseline scenario

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

The CPA will be the installation of a new grid-connected renewable power plant/unit; hence according to ACM0002, 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".

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

>>

Each CPA will be a grid-connected wind power generation project activity according to ACM0002 version 12.3.0. The most likely scenario under the PoA is that the CPA project activity is the installation of a new grid-connected wind power plant/unit, therefore the baseline scenario is *the electricity delivered to the grid by the project activity that 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"*.

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

>>

Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CDM Project Activity (CPA) would occur. The proof of additionality is based on the eligibility criteria as outlined above and considering to the latest the 'STANDARD FOR THE DEVELOPMENT OF ELIGIBILITY CRITERIA FOR THE INCLUSION OF A PROJECT ACTIVITY AS A CPA UNDER THE POA', Version 01.0.[10] The actual proof of additionality following the methodology ACM0002 and the related tools will be done on CPA level as follows.

According to ACM0002, version 12.3.0., the additionality of each CPA 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.

[10] EB 63, Annex 3

The current 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" [11].

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:

[11] 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 CPAs because the project activities will produce economic benefit other than the CDM related income, notably from electricity sale. Instead, the the investment comparison analysis (Option II) or benchmark analysis (Option III) shall be used.

Sub-step 2b: Option II. Apply investment comparison analysis

The GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (EB 62, Annex 5)[12], para19 states *"If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate."*

The investment comparison analysis (Option II) is not applicable to the project because the alternative of the project is "Equivalent electricity service provided by the grid", which is not a single project.

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

The GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (EB 62, Annex 5)[13], para13 states *"In the cases of projects which could be developed by an entity other than the project participant the benchmark should be based on parameters that are standard in the market."*

When applying Option III, the financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered.
Discount rates and benchmarks shall be derived from:

(a) Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data;

(b) Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds required return on comparable projects;

(c) A company internal benchmark (weighted average capital cost of the company), only in the particular case referred to above in paragraph 5. The project developers shall demonstrate that this benchmark has been consistently used in the past i.e. that project activities under similar conditions developed by the same company used the same benchmark;

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

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

(d) Government/official approved benchmark where such benchmarks are used for investment decisions;

(e) Any other indicators, if the project participants can demonstrate that the above Options are not applicable and their indicator is appropriately justified.

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

Calculate the suitable financial indicator for the proposed CDM project activity,. include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but possibly including *inter alia* subsidies/fiscal incentives,[14] ODA, etc., where applicable), and, as appropriate, non-market cost and benefits in the case of public investors if this is standard practice for the selection of public investments in the host country.

Present the investment analysis in a transparent manner and provide all the relevant assumptions, preferably in the CPA-DD, or in separate annexes to the CPA-DD, so that a reader can reproduce the analysis and obtain the same results. Refer to all critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital). Justify and/or cite assumptions in a manner that can be validated by the DOE. In calculating the financial/economic indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions (e.g. insurance premiums can be used in the calculation to reflect specific risk equivalents).

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.

1. Government PPA[15]: The electricity produced is sold at specially determined feed-in tariff for wind power generation projects. The feed in tariff is based on a tendering process that is determined by the CPA developer with a ceiling of 1.15 South African Rand (ZAR) per kWh as fixed by the government of South Africa. 70% of this feed in tariff is based and determined on cost of equipment, construction, installation, O&M etc (price elements). The remaining 30% of the weight age is based socio-economic development activities that will be undertaken by the potential CPA developers for the local community (non price elements). The potential CPA developers will require to submit documentation to the government to support their claim for the desired feed in tariff.
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 price.

The "White Paper on Renewable Energy"[16] by the Department of Minerals and Energy, Government of South Africa was published on November of 2003 and notes "the Ministry is committed to this policy document which is intended to give much needed thrust to renewable energy; a policy that envisages a

[14] See EB guidance on the consideration of national/local/sectoral policies and measures for the baseline setting. The Executive Board at its 22nd meeting (Annex 3) clarified the treatment of national and sectoral policies. See also Information note on the implementation of E+/E- in the context of projects on the agenda of the fifty-third meeting of the CDM Executive Board

[15] Source: http://www.engineeringnews.co.za/article/nersa-concurs-with-renewables-bidding-process-2011-08-10

[16] RSA Policy document: http://www.energy.gov.za/files/policies/whitepaper_renewables_2003.pdf

range of measures to bring about integration of renewable energies into the mainstream energy economy. To achieve this aim Government is setting as its target 10,000 GWh (0.8 Mtoe) renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro. The renewable energy is to be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. This is approximately 4% (1667 MW) of the projected electricity demand for 2013 (41539 MW)."

As per the "CLARIFICATIONS ON THE CONSIDERATION OF NATIONAL AND/OR SECTORAL POLICIES AND CIRCUMSTANCES IN BASELINE SCENARIOS" (EB 22, Annex 3 para 7b)[17], the EB notes "National and/or sectoral policies or regulations under paragraph 6 (b) that have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario (i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place)". Thus, additional income generated any tariffs approved by the South African regulatory bodies need not be taken into account when calculating the project revenues.

The CPA-PDD will present a clear comparison of the financial indicators and if the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

Sub-step 2d: Sensitivity analysis

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

Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially/economically attractive (as per Step 2c) or is unlikely to be financially/economically attractive (as per Step 2c).

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)[18] variables that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation.

At least the typical main variables are to be considered in the sensitivity analysis:

1. Total investment cost of the CPA
2. Power sale prices and or other sales related incomes (e.g. capacity and energy sales, feed-in-tariffs, sales of renewable energy certificates (RECs))

[17] EB Clarification: http://cdm.unfccc.int/EB/022/eb22_repan3.pdf

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

3. Power generation output

The financial analysis shall 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). Unless argued otherwise, the main variables considered for the sensitivity analysis are:

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

If the financial indicator (e.g. IRR) for any of the above variables is above the benchmark, the activity is deemed to be economically feasible without the sale of CERs. Therefore the investment analysis does not provide a valid argument in favour of additionality and the CPA-PDD shall provide a "Barrier Analysis" (Step 3).

If the additionality criteria are met, then the Barrier Analysis is option and CPA-PDD shall proceed to providing a "Common Practice Analysis" (Step 4)

Sensitivity analysis < Benchmark	Step 3 optional, proceed to Step 4
Sensitivity analysis > Benchmark	Proceed to step 3: Barrier analysis

When performing the investment analysis, the CDM "Guidelines On The Assessment Of Investment Analysis" (Version 05, EB62, Annex 5)[19] should be considered. It is recommended to check that all guidance are met and followed.

Step 3: Barrier Analysis

If Barrier Analysis is carried out then the CPA-PDD will provide argumentation that the project faces barriers that:

(3a) Prevent the implementation of this type of proposed project activity; and

(3b) Do not prevent the implementation of at least one of the alternatives.

The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed activity undertaken without being registered under this PoA. Typical barriers include: investment barriers, technological barriers, political barriers, and barriers due to prevailing practice. The latest version (at the time of drafting the CPA-DD) of "Guidelines for objective demonstration and assessment of barriers"[20] shall be used to demonstrate applicable barriers to the CPA.

Step 4. Common Practice Analysis

Unless the proposed project type has demonstrated to be first-of-its kind, the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region. This test is a **credibility**

[19] Guidelines on the assessment of investment analysis
[20] Guidelines for barriers: http://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid38.pdf

check to complement the investment analysis (Step 2). Identify and discuss the existing common practice through the following steps::

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

Based on the installed capacity (MW) of the proposed project activity, the applicable output range will be calculated at +/- 50% (in MW) of the proposed activity.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities shall not be included in this step;

CPA PDD will provide a database of projects in the applicable geographical area that are operational prior to the start date of the proposed project activity that lie within the output range as defined in step 1. The database will include the installed capacity of individual projects and will be cross checked with the UNFCCC CDM pipeline to identify the registered projects. The registration number of the projects will be noted in the database and excluded from the calculation of 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}

'Different technologies' as defined under para 4 of the Guideline for Common Practice Analysis ver 1.0 will be applied to the database to identify projects/plants that apply technologies not concurrent with the proposed project activity. Other CDM project activities (project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process and/or projects that have acquired host country approval for the purpose of pursuing CDM) will not be included for the purpose of defining 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

Once N_{all} and N_{diff} have been identified, the factor shall be calculated and project activity will be concluded as a common practice in the geographical area if the factor F, which as per the guidelines is greater than 0.2 and the value of $N_{all} - N_{diff}$ is greater than 3.

If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive or faces barriers. Therefore, if similar activities are identified as described above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially/economically attractive (e.g., subsidies or other financial flows) and which the proposed project activity cannot use or did not face the barriers to which the proposed project activity is subject. If necessary data/information of some similar projects are not accessible for PPs to conduct this analysis, such projects can be excluded from

this analysis. In case similar projects are not accessible, the PDD should include justification about non-accessibility of data/information.

Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects were carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

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

>> Here the PPs shall provide the key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA. The criteria shall be based on additionality assessment undertaken in E.5.1 above. The project participants shall justify the choice of criteria based on analysis in above section.
It shall be demonstrated how these criteria would be applied to the additionality of a typical CPA at the time of inclusion.

NOTE: Information provided here shall be incorporated into the CDM-CPA-DD that has been specified for this PoA and shall be included in documentation submitted by project participants at registration of PoA.

Each CPA is expected to assess and demonstrate additionality using an investment analysis approach following the approach described in the latest "*Tool for the demonstration and assessment of additionality*" as described in A.4.3 and E.5.1.

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

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

>>
Each CPA under the PoA will use ACM0002 "*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*" version 12.3.0

The methodology is applicable for CPAs that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).

Every CPA under the PoA will consist of a wind power generation project that is grid-connected and falls under option (a) mentioned above.

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

>>
The typical CPA is a wind power generation project connected to a national or/sub-national grid. The reduced emissions 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 02.2.1), 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:

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

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 the typical CPA methodology (a) is used. The CPA will consist of a wind power generation project that is grid-connected and falls under option (a).

(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 2.2.1) 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 2.2.1) 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) emission 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.

There is presently only one transmission company in South Africa, state owned Eskom Transmission that operates, maintains and administer the national grid.

In 2011, Eskom generates approximately 95% of the electricity used in South Africa and approximately 45% of the electricity used in Africa (net maximum self-generated capacity: 41 194 MW). Eskom directly provides electricity to about 45% of all end-users in South Africa. The other 55% is resold by redistributors (including municipalities). Eskom generates, transmits and distributes electricity to customers in the industrial, mining, commercial, agricultural and residential sectors, and to redistributors.[21] The national grid spans all across the country (see Figure 2 above). The transmission network consists of 28 790 km of transmission lines of voltages ranging between 132 to 765 kV and a network of 160 substations.

Table 4: Electricity production by own stations and electricity purchased by Eskom

Electricity production by own stations and electricity purchased by Eskom						
		2011	2010	2009	2008	2007
Coal-fired	(GWh)	220,219	215,940	211,941	222,908	215,211
Hydro-electric	(GWh)	1,960	1,274	1,082	751	2,443
Pumped storage	(GWh)	2,953	2,742	2,772	2,979	2,947
Gas turbine	(GWh)	197	49	143	1,153	62
Nuclear	(GWh)	12,099	12,806	13,004	11,317	11,780
Wind energy	(GWh)	2	1	2	1	2
Total own production	**(GWh)**	**237,430**	**232,812**	**228,944**	**239,109**	**232,445**

[21] Eskom 2011 Annual Report, 1 April 2010 – 31 March 2011

Electricity purchased by Eskom						
- Foreign purchases (GWh)*	(GWh)	13,613	13,754	12,189	11,510	11,483
- Local independent power producers and co-generation	(GWh)	1,833	-	-	-	-
Consumed by Eskom pumped storage	(GWh)	- 3,962	- 3,695	- 3,816	- 4,136	- 3,937
Net production and import volumes	**(GWh)**	**248,914**	**242,871**	**237,317**	**246,483**	**239,991**
Low-cost/must-run (hydro, nuclear, wind energy)	%	6%	6%	6%	5%	6%
* Foreign imports include wheeling of electricity. Source: Eskom 2011 Annual Report, 1 April 2010 – 31 March 2011						

Table 5: Eskom's power station net maximum capacity

Eskom's power station net maximum capacity						
		2011	2010	2009	2008	2007
Coal-fired	(MW)	34,952	34,658	34,294	33,566	33,036
Hydro-electric	(MW)	600	600	600	600	600
Pumped storage	(MW)	1,400	1,400	1,400	1,400	1,400
Gas turbine	(MW)	2,409	2,409	2,409	1,378	925
Nuclear	(MW)	1,830	1,800	1,800	1,800	1,800
Wind energy	(MW)	3	3	3	3	3
Total capacity	(MW)	41,194	40,870	40,506	38,747	37,764
Source: Eskom 2011 Annual Report, 1 April 2010 – 31 March 2011						

According to the "Tool to calculate the emission factor for an electricity system" (version 2.2.1), the emission factor for imports from connected electricity systems located in other countries is 0 tCO_2/MWh. Hence, the inclusion of the imported energy will only affect the total amount of electricity. Additionally, electricity exports have not been excluded from the total electricity generation.

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

Option I ("Only grid power plants are included in the calculation") has been chosen as 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 one of the following methods:

(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.

The simple OM method (option a) can only be used if low-cost/must-run resources[22] constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

The dispatch data analysis (option c) cannot be used if off-grid power plants are included in the project electricity system as per Step 2 above.

For the emission factor calculation of the South African nation grid Option (a) "Simple OM" or (d) Average OM can been chosen because:

a. sufficient data is not available for using the Dispatch Data Analysis option, and

b. If it can be proven that low-cost/must-run resources in South Africa have represented less than 50% of total grid generation over the 5 most recent years (2007-2010), so the Simple OM method can be used. Or else the Average OM is recommended.

For the Simple OM, the Simple Adjusted OM and the Average OM, the emissions factor can be calculated using either of the two following data vintages:

• *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 five most recent calendar years prior to the time of submission of the CDM-PDD for validation.

• *Ex post* option: If the *ex post* option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required calculating the emission factor for year *y* is usually only available later than six months after the end of year *y*, alternatively the emission factor of the previous year *y-1* may be used. If the data is usually only available 18 months after the end of year *y*, the emission factor of the year preceding the previous year *y-2* may be used. The same data vintage (*y*, *y-1* or *y-2*) should be used throughout all crediting periods.

The data vintage chosen should be documented in the CDM-PDD and should not be changed during the crediting period.

Power plants registered as CDM project activities should be included in the sample group that is used to calculate the operating margin if the criteria for including the power source in the sample group apply.

[22] Low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

For the individual CPA the *ex-ante* data vintage shall be based on the latest data available when applying the Simple OM calculation. In case that during the length of the programme of activities the Simple OM will become not applicable anymore due to the defined conditions above, the CPA shall apply on of the remaining option provided by the "Tool to calculate the emission factor for an electricity system".

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

(a) Simple OM / Average OM

The simple / average OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple / average OM may be calculated by one of the following two options:

- Option A: Based on the net electricity generation and a CO2 emission factor of each power unit;[23] or

- Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

Option A - Calculation based on average efficiency and electricity generation of each plant

Under this option, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} \quad (1)$$

Where:

$EF_{grid,OMsimple,y}$ = Simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit *m* in year *y* (tCO_2/MWh)

[23] Power units should be considered if some of the power units at the site of the power plant are low-cost/must-run units and some are not. Power plants can be considered if *all* power units at the site of the power plant belong to the group of low-cost/must-run units or if *all* power units at the site of the power plant do *not* belong to the group of low-cost/must-run units.

m = All power units serving the grid in year *y* except low-cost / must-run power units
y = The relevant year as per the data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$
The emission factor of each power unit *m* should be determined as follows:

- **Option A1**. If for a power unit m data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL,m,y}$) should be determined as follows:

$$EF_{EL,m,y} = \frac{\sum_i (FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y})}{EG_{m,y}} \quad (2)$$

Where:

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (t CO_2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type *i* consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year y (t CO_2/GJ)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh))
m	=	All power units serving the grid in year y except low-cost/must-run power units
i	=	All fossil fuel types combusted in power unit *m* in year *y*
y	=	The relevant year as per the data vintage chosen in Step 3

- **Option A2**. If for a power unit *m* only data on electricity generation and the fuel types used is available, the emission factor should be determined based on the CO_2 emission factor of the fuel type used and the efficiency of the power unit, as follows:

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}} \quad (3)$$

$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (t CO_2/MWh)
$EF_{CO2,m,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year y (t CO_2/GJ)
$\eta_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh))
m	=	All power units serving the grid in year y except low-cost/must-run power units
i	=	All fossil fuel types combusted in power unit *m* in year *y*
y	=	The relevant year as per the data vintage chosen in Step 3

- **Option A3**. If for a power unit m only data on electricity generation is available, an emission factor of 0 tCO_2/MWh can be assumed as a simple and conservative approach.

Determination of $EG_{m,y}$

For grid power plants, $EG_{m,y}$ should be determined as per the provisions in the monitoring tables.

Option B - Calculation based on total fuel consumption and electricity generation of the system

Under this option, the simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_i (FC_{i,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y})}{EG_y} \quad (4)$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year y (t CO_2/MWh)
$FC_{i,y}$	=	Amount of fossil fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y (t CO_2/GJ)
EG_y	=	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year *y* (MWh)
i	=	All fossil fuel types combusted in power sources in the project electricity system in year *y*
y	=	The relevant year as per the data vintage chosen in Step 3

For this approach (simple OM) to calculate the operating margin, the subscript *m* refers to the power plants/units delivering electricity to the grid, not including low-cost/must-run power plants/units, and including electricity imports[24] to the grid. Electricity imports should be treated as one power plant *m*.

Given the data availability in South Africa the Simple OM shall preferably be used by the CPA applying Option A1, if applicable.

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 02.2.1):

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,

[24] As described above, an import from a connected electricity system should be considered as one power source

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.

The option chosen should be documented in the CPA-PDD.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

The sample group of power units *m* used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently (SET5-units) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);
(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) ($SET_{\geq 20\%}$) and determine their annual electricity generation ($AEG_{SET\text{-}\geq 20\%}$, in MWh);
(c) From $SET_{5\text{-}units}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin. In this case ignore steps (d), (e) and (f).

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activities, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample\text{-}CDM}$) the annual electricity generation ($AEG_{SET\text{-}sample\text{-}CDM}$, in MWh);

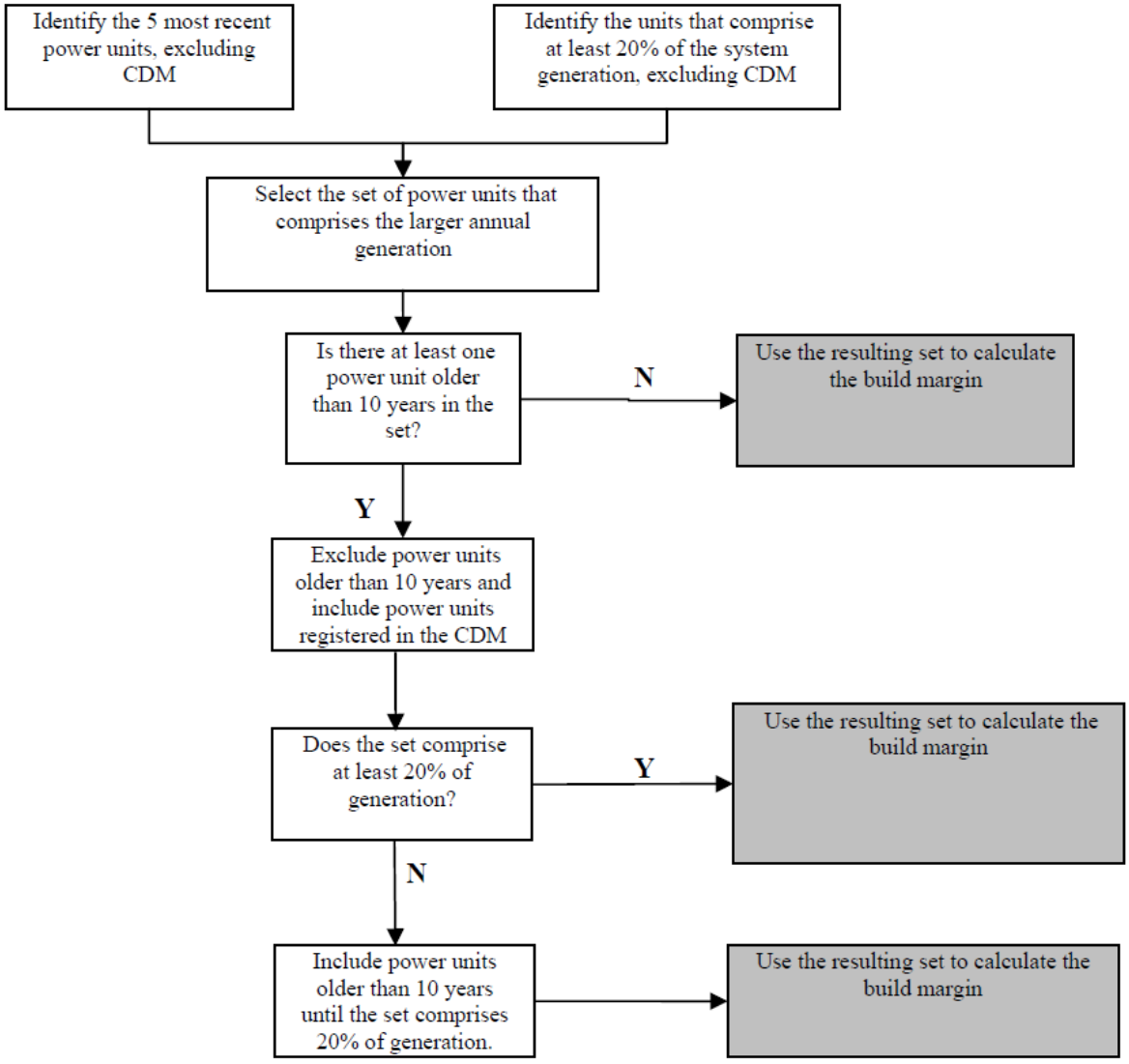
If the annual electricity generation of that set is comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEG_{SET\text{-}sample\text{-}CDM} \geq 0.2 \times AEG_{total}$), then use the sample group $SET_{sample\text{-}CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group $SET_{sample\text{-}CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample\text{-}CDM\text{->}10yrs}$).

The following diagram summarizes the procedure above:



The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units *m* during the most recent year *y* for which electricity generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \cdot EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad (5)$$

Where:

$EF_{grid,BM,y}$	= Build Margin CO_2 emission factor in year y (t CO_2/MWh)
$EG_{m,y}$	= Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	= CO_2 emission factor of power unit *m* in year *y* (t CO_2/MWh)
m	= Power units included in the Build Margin
y	= Most recent historical year for which electricity generation data is available.

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) should be determined as per the guidance in Step 4 (a) for the simple OM, using options A1, A2 or A3, using for *y* the most recent historical year for which electricity generation data is available, and using for *m* the power units included in the build margin.

If the power units included in the build margin *m* correspond to the sample group $SET_{sample\text{-}CDM\text{->}10yrs}$, then, as a conservative approach, only option A2 from guidance in Step 4 (a) can be used and the default values provided in Annex 1 of the tool shall be used to determine the parameter $\eta_{m,y}$.

Step 6: Calculate the combined margin (CM) emission 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 (%)

As per "Tool to calculate the emission factor for an electricity system" (page 14)[25] The following default values should be used for w_{OM} and w_{BM}:

[25] Source: http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf

- 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 typical CPAs are 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.

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)

Estimation of emissions reductions prior to validation

CPA developer should prepare as part of the CPA-DD an estimate of likely emission reductions for the proposed crediting period. This estimate should, in principle, employ the same methodology as selected above.

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

At the start of the second and third crediting period project proponents have to address two issues:

- Assess the continued validity of the baseline; and
- Update the baseline.

In assessing the continued validity of the baseline, a change in the relevant national and/or sectoral regulations between two crediting periods has to be examined at the start of the new crediting period. If at the start of the project activity, the project activity was not mandated by regulations, but at the start of the second or third crediting period regulations are in place that enforce the practice or norms or technologies that are used by the project activity, the new regulation (formulated after the registration of the project activity) has to be examined to determine if it applies to existing plants or not. If the new regulation applies to existing CDM project activities, the baseline has to be reviewed and, if the regulation is binding, the baseline for the project activity should take this into account. This assessment will be undertaken by the verifying DOE.

For updating the baseline at the start of the second and third crediting period, new data available will be used to revise the baseline scenario and emissions. Project participants shall assess and incorporate the impact of new regulations on baseline emissions.

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

Data / Parameter:	**$EF_{grid,OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operating margin emission factor of the grid
Source of data used:	Determined at CPA level
Value applied:	Determined at CPA level
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 0.5 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:	**$EF_{grid,BM,,y\ y}$**
Data unit:	tCO_2/MWh
Description:	Build margin emission factor of the grid
Source of data used:	Calculated, vintage 2010, see Annex 3
Value applied:	Determined at CPA level
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 0.5 for the first crediting period according to the "Tool to calculate the emission factor for an electricity system" (version 2.2.1).
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:	Calculated as per the "Tool to calculate the emission factor for an electricity system"
Value applied:	Determined at CPA level
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 latest "Tool to calculate the emission factor for an electricity system" (Version 2.2.1).
Any comment:	

Data / Parameter:	**$FC_{i,m,y}$ / $FC_{i,,y}$**
Data unit:	Mass or volume unit

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:	Utility or government records or official publications. Determined at CPA level
Value applied:	Determined at CPA level
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:	

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:	Utility Bills
Value applied:	Determined at CPA level
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:	

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:	Determined at CPA level
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:	

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:	Determined at CPA level
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:	

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:	Determined at CPA level
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:	

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

All data collected as part of monitoring shall be archived electronically and be kept for at least two years after the end of the last crediting period. 100% of the data should be monitored if not indicated otherwise in the tables below. All measurements should be conducted with calibrated measurement equipment according to relevant industry standards.

In addition, the monitoring provisions in the tools referred to in this methodology apply.

Some parameters listed below under "data and parameters" either need to be monitored continuously during the crediting period or need to be calculated only once for the crediting period, depending on the data vintage chosen, following the provisions in the baseline methodology procedure outlined above and the guidance on "monitoring frequency" for the parameter. The calculation of the operating margin and build margin emission factors should be documented electronically in a spread sheet that should be attached to the CPA-DD. This should include all data used to calculate the emission factors accordingly to the methodology following the "Tool to calculate the emission factor for an electricity system" (Version 2.2.1):

- The following information for each grid-connected power plant/unit:
  - Information to clearly identify the plant;
  - The date of commissioning;

- The capacity (MW);
- The fuel type(s) used;
- The quantity of net electricity generation in the relevant year(s);[26]
- If applicable: the fuel consumption of each fuel type in the relevant year(s);
- In case where the simple OM or the simple adjusted operating margin is used: information whether the plant/unit is a low-cost/must-run plant/unit.

- Net calorific values used;
- CO_2 emission factors used;
- Plant efficiencies used, if applicable;
- Identification of the plants included in the build margin and the operating margin during the relevant time year(s);
- The quantity of electricity displaced by the project activity;

The data should be presented in a manner that enables reproducing of the calculation of the build margin and operating margin grid emission factor.

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

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	Determined at CPA level
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. CPA shall provide description of equipment used for measurement, if applicable, and its accuracy class.
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:	

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

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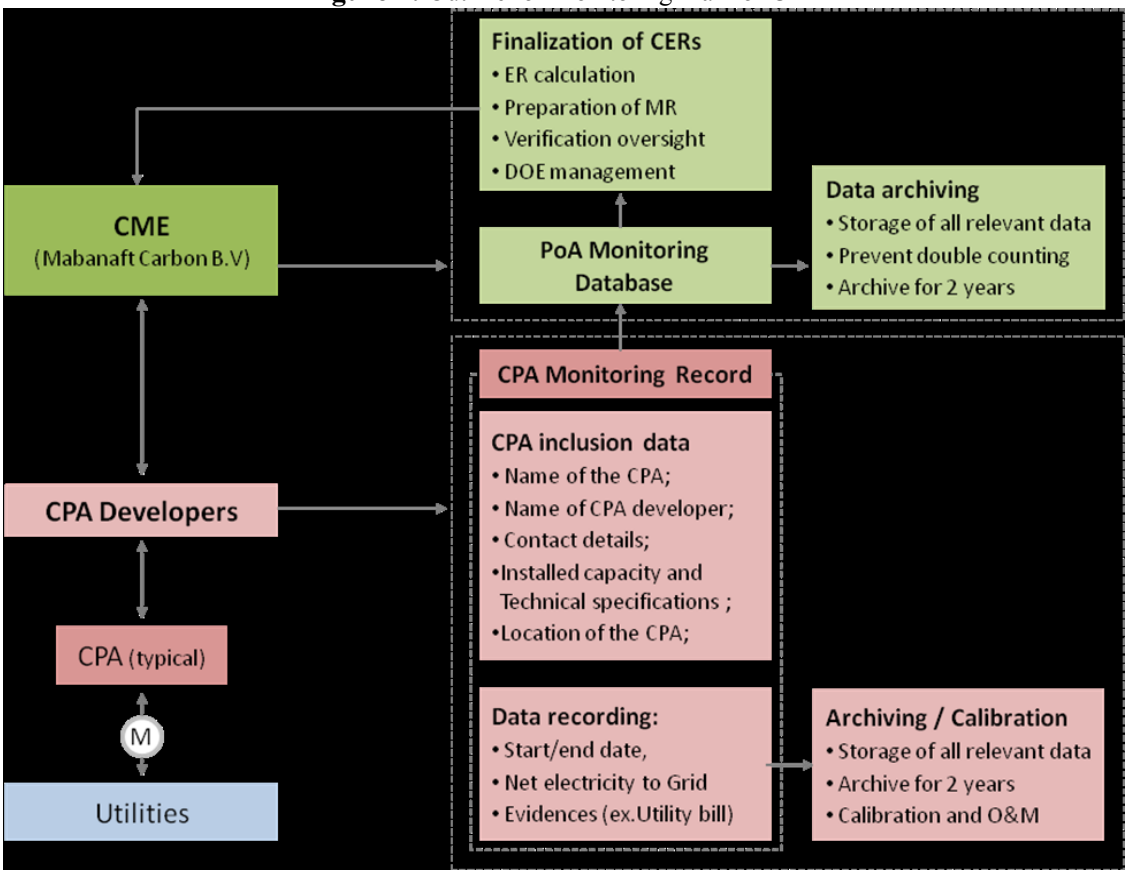
The purpose of the monitoring plan will be to measure and record the net electricity delivered to the electrical grid. Details of the CPA monitoring plan will be described within each CPA, considering the following elements.

[26] In case of the simple adjusted OM, this includes the five most recent years or long-term averages for hydroelectricity production.

Figure 4: Outline for Monitoring Plan for CPA



1. 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 each CPA. For each CPA, all parameters included in E.7.1 will be monitored, if applicable, by the developer of the CPA. The main measure for the PoA is the measurement of net electricity supplied to the grid and assuring the correct operation and maintenance of the measuring equipment.

The CPA owner is responsible for the construction of the respective wind farm project and providing accurate data to avoid any conflict between the CPA-DD and the actual site conditions. The CPA owners will also ensure that the project meets the stated timelines for construction, operation and maintenance over the life time of the project. As defined by the CME, the CPA owner shall ensure that the periodic data is collected, recorded and stored for appropriate use.

Data collection
The CME will establish and maintain a central PoA Monitoring Database covering information and data of each CPA. The following data will be recorded:

Basic data for inclusion	• Name of the CPA; • Name of the CPA developer; • Contact details of the developer including contact person, address, telephone and/or email address; • Installed capacity and other relevant technical specifications of each CPA; • Location of the CPA (e.g. GPS coordinates);
Data during crediting period	• Verification status, CPA monitoring records and monitoring reports of each CPA.

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

For each CPA, all parameters included in E.7.1, if applicable, will be monitored by the CPA developer and recorded electronically in a CPA monitoring record. The CPA developer will provide the CPA monitoring records to the CME. The CME will document and store all data related to parameters included in section E.7.1 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 CME will be responsible for the preparation of the monitoring report and 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.

2. Data quality control
The data and reports provided by each CPA developer to the CME will be cross checked internally by the CME to ensure the accuracy and completeness of data. In case of mistakes, corrective action will be applied to avoid future similar mistakes.

3. Training and monitoring personnel
The CME will provide all necessary information and training material that enables CPA developers to conduct the monitoring process as required by the PoA. The CPA developer ensures that all persons that participate in the actual monitoring process for the CPA will be suitably qualified and trained in the operation and maintenance of the CPA project activity. If required, these persons will also receive training on the application of the monitoring plan by the CME.

Leakage
No leakage emissions are considered.

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

>>

The date of completing the baseline study and applying the monitoring methodology: 06/07/2012

Responsible entity:
Perspectives GmbH, Baumeisterstrasse 2, 22099 Hamburg, Germany (www.perspectives.cc)

Contact persons:
- Marc André Marr (Head of Carbon Project Services; marr@perspectives.cc),
- Stefan Wehner (Carbon Project Consultant; stefan.wehner@perspectives.cc),
- Arindam Basu (Carbon Project Consultant; basu@perspectives.cc).

Annex 1

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

Organization:	Mabanaft Carbon B.V.
Street/P.O.Box:	Wihelminakade 101
Building:	43rd floor
City:	Rotterdam
State/Region:	
Postfix/ZIP:	3072AP
Country:	The Netherlands
Telephone:	+31 (0) 10-411 70 44
FAX:	+31 (0) 10-411 07 53
E-Mail:	post@mabanaft.nl
URL:	http://www.mabanaft.com
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Benders
Middle Name:	
First Name:	Ruben
Department:	Mabanaft Carbon B.V.
Mobile:	
Direct FAX:	+31 (0) 10 411-0753
Direct tel:	+31102906942
Personal E-Mail:	ruben.benders@mabanaft.nl

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The PoA will not make use of any public funding or ODA

Annex 3

BASELINE INFORMATION

Official Eskom database
Link: http://financialresults.co.za/2011/eskom_ar2011/add_info_tables.php
To be determined at CPA Level. Most recent data available online to be used for calculation.

Annex 4

MONITORING INFORMATION

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