



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

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NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).



SECTION A. General description of small-scale programme of activities (PoA).

A.1 Title of the small-scale programme of activities (PoA):

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Installation of energy efficient ventilation fans

Version: 01

Date: 26/04/2012

A.2. Description of the small-scale programme of activities (PoA):

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1. General operating and implementing framework of PoA

This programme of activities (PoA) aims to overcome the barriers facing the installation of energy efficient ventilation fans at sites across South Africa. Ventilation fans are used to provide large flows of air with the objective of controlling temperature, replenishing oxygen, or removing moisture, particulates, and carbon dioxide. This is achieved through the rotation of a number of blades which are connected to a hub and shaft, and driven by a motor or turbine. Ventilation fans are commonly used in the mining and manufacturing industries.

The proposed project activity will improve the energy efficiency of existing or new ventilation fan systems through the installation of lower electricity consuming fans which deliver a similar¹ air flow as conventional ventilation fans.

Promethium Carbon (Pty) Ltd (hence forth referred to as Promethium) will be responsible for the project documentation of the PoA, as well as the project documentation of the generic component project activity (CPA). Nedbank Limited, through its Nedbank Capital Division, will act as the Coordinating and Managing Entity (CME) of the PoA. The installation of the energy efficient ventilation fan systems will typically be managed by the owners of each site, hence forth referred to as the CPA implementer(s).

2. Policy/measure or stated goal of the PoA

The goal of this PoA is to reduce greenhouse gas emissions through the installation of energy efficiency ventilation fans at sites across South Africa. These ventilation fans will reduce the electricity consumption from the national grid.

The historically low cost of electricity in South Africa also means that currently, carbon intensive electricity is cheaper than any other source of power. This is because the electricity generating equipment is tried and tested and South Africa has an abundant supply of coal. This PoA will provide the CPA implementers with finance (from the revenue of CERs) to implement energy efficiency projects in South Africa.

The PoA makes a positive contribution to sustainable development. The South African Designated National Authority (DNA) evaluates sustainability in three categories: economic, environmental, and social. The contribution of the programme towards sustainable development is discussed below in terms of these three categories:

¹ Not significantly smaller than the baseline air flow (maximum -10%) or significantly larger than the baseline air flow (maximum +50%). This is in accordance with paragraph 2 of AMS-II.C version 13.



Environmental

This PoA supports the emission mitigation actions of South Africa. According to a letter sent to the United Nations Framework Convention on Climate Change (UNFCCC) on 29/01/2010, South Africa committed to “taking nationally appropriate mitigation actions to enable a 34% deviation below the ‘Business as Usual’ emissions growth trajectory by 2020 and a 42% deviation below the ‘Business as Usual’ emissions growth trajectory by 2025”.

The programme will reduce electricity consumption from the national grid. Coal accounts for more than 92% of the fuel used in South Africa’s electricity generation² and is therefore heavily carbon-intensive. The reduction in electricity consumption from the grid will result in a reduction of greenhouse gas emissions, as well as all of the negative impacts of coal mining. These impacts include: the utilisation of scarce water resources, SO₂ emissions and the impacts associated with the disposal of coal ash.

Economic

South Africa’s national electricity provider, Eskom, carried out planned electricity supply interruptions at the beginning of 2008. These interruptions were caused by the demand for electricity exceeding the supply of electricity. During the interruptions, grid electricity was not accessible. Promoting energy efficiency projects at sites across South Africa will reduce the pressure on energy infrastructure, thereby making important contributions to the country’s economic sustainability.

Social

The South African Government’s economic policy is defined in the New Growth Path. Unemployment is recognised as key problem in the country that needs to be addressed. This PoA will create jobs during the installation phase of the programme, thereby supporting Government’s policy objectives. Personnel will also acquire additional skills as they will be trained on how to properly install and maintain the new fans.

This programme will improve the working conditions at the sites where the ventilation fans are installed. The new ventilation fans will remove dust particles, dilute contaminants and move air to specific points underground, thereby improving the health and safety of the site workers.

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

The CME of the PoA is Nedbank Limited, acting through its Nedbank Capital Division. This CME is a registered bank in South Africa, and confirms that the proposed PoA is a voluntary action. Furthermore, South Africa has no mandatory requirements/policies that enforce the installation of energy efficient ventilation fans. The CPA implementer(s) will voluntarily install the new technology.

² Department of Water and Environmental Affairs. (2010). *National Climate Change Response Draft Green Paper*, pg 13, para...3. Retrieved from South Africa Government Online: <http://www.environment.gov.za>. Data accessed 16/02/2011.



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

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The CME is the entity that will communicate with the Executive Board. Nedbank Limited, through its Nedbank Capital Division, will act as the CME of the PoA. The CME’s contact details are provided in Annex 1.

The table below shows the project participant that is registered in relation to the PoA.

Name of Party involved (*) (host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of South Africa (host)	Nedbank Limited (Private Entity)	No

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

A.4.1.1. Host Party (ies):

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Republic of South Africa

A.4.1.2. Physical/ Geographical boundary:

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All CPAs associated with this PoA will be implemented within the geographical boundary of South Africa. This is illustrated in the figure below. The CME will take due cognisance of the requirements of all applicable national and/or sectoral polices and regulations when implementing the PoA.



South Africa – the geographical boundary of the PoA



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

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

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Each CPA will involve the installation of a number of energy efficient ventilation fans at sites across South Africa. It is envisaged that each CPA will install a minimum of 100 fans to ensure that a sufficient amount of CERs are generated in each component project. The CPA will, however, be limited to a maximum annual energy saving of 60 GWh_e in accordance with the applied small-scale methodology.

Ventilation fans can be used in a number of applications including, but not limited to:

- Removing particulates, dust and fumes from mills and factories;
- Ventilating underground mines;
- Maintaining positive air pressures in closed spaces;
- Diluting contaminants in underground mines;
- HVAC systems.

The most common type of fan that will be used in this programme is the axial fan however, centrifugal or propeller fans may also be installed. A detailed description of the type of ventilation installed in each component project will be provided in each CPA-DD.

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

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The eligibility criteria for including a CPA in this PoA are given below, as per version 01 of the ‘Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities’.

1. The CPA shall involve the installation of energy efficient ventilation fans.
2. The CPA shall be located within the geographical boundary of South Africa, as defined in section A.4.1.2 of the PoA.
3. The CPA is uniquely defined by the description of the site(s) where it is implemented. This description shall include the GPS coordinates.
4. Each installed ventilation fan shall have a unique identification code to prevent the double counting of emission reductions.
5. The CPA shall meet with all (where applicable) conditions of AMS-II.C version 13.
6. Each CPA shall have annual energy savings of less than 60 GWh_e.
7. Each CPA shall meet the requirements for a debundling check in accordance with EB 54 Annex 13.
8. The CPA shall conduct a local stakeholder consultation process and record all comments received.
9. The CPA will provide documentary evidence that the start date of the project is after the PoA’s Global Stakeholder Participation (GSP).
10. The CPA shall confirm in writing whether they have received funding from Annex 1 parties for the implementation of the project. If they have received such funding then they must provide documentary evidence that it has not resulted in a diversion of official development assistance.
11. The CPA shall warrant that the project has not been included as a CPA in another PoA and/or been registered as a CDM project activity.
12. The CPA shall demonstrate additionality as per the guidance provided in section E.5.1 in the PoA.



13. The CPA shall sign a contract with the CME in order to participate in the programme.
14. The CPA shall be approved by the CME prior to its incorporation in the PoA.

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

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The CME confirms that the PoA is a voluntary coordinated action. The PoA allows for the conditional participation of CPAs that are implementing energy efficient ventilation fan projects. The CME is developing and coordinating the PoA because of the expected revenue arising from the sale of carbon credits in the programme. There are no mandatory policies/regulations in South Africa that would require the development of the CPA types envisaged falling under the provisions of this PoA.

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

A.4.4.1. Operational and management plan:

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The CME of the PoA is responsible for the documentation of the PoA and the CPAs that fall under it. The CPA implementer(s) will manage the installation and operation of the ventilation fans, and will meet with all information requirements as needed by the CME.

A database will be set up by the CME of the PoA. It will include the following information for each CPA:

1. Name of the CPA.
2. Names of the site where the CPA is implemented.
3. Location of the CPA including GPS coordinates.
4. Name of the CPA developer.
5. Contact details of the CPA developer including contact person, address, telephone and email address.
6. Installed capacity and other relevant technical specification of the CPA.
7. A list of the ventilation fans' unique identification codes to avoid the double counting of emission reductions.
8. Start date of the CPA.
9. The commissioning date of the ventilation fans.

The CME will also keep records of the following:

10. The signed agreement with the CME to participate in the programme.
11. During the crediting period, the verification status, monitoring reports and records for the CPA.
12. Destruction/scraping records of the ventilation fans in case of replacement. The scraping process shall be independently verified, as per the requirements if AMS-II.C version 13.

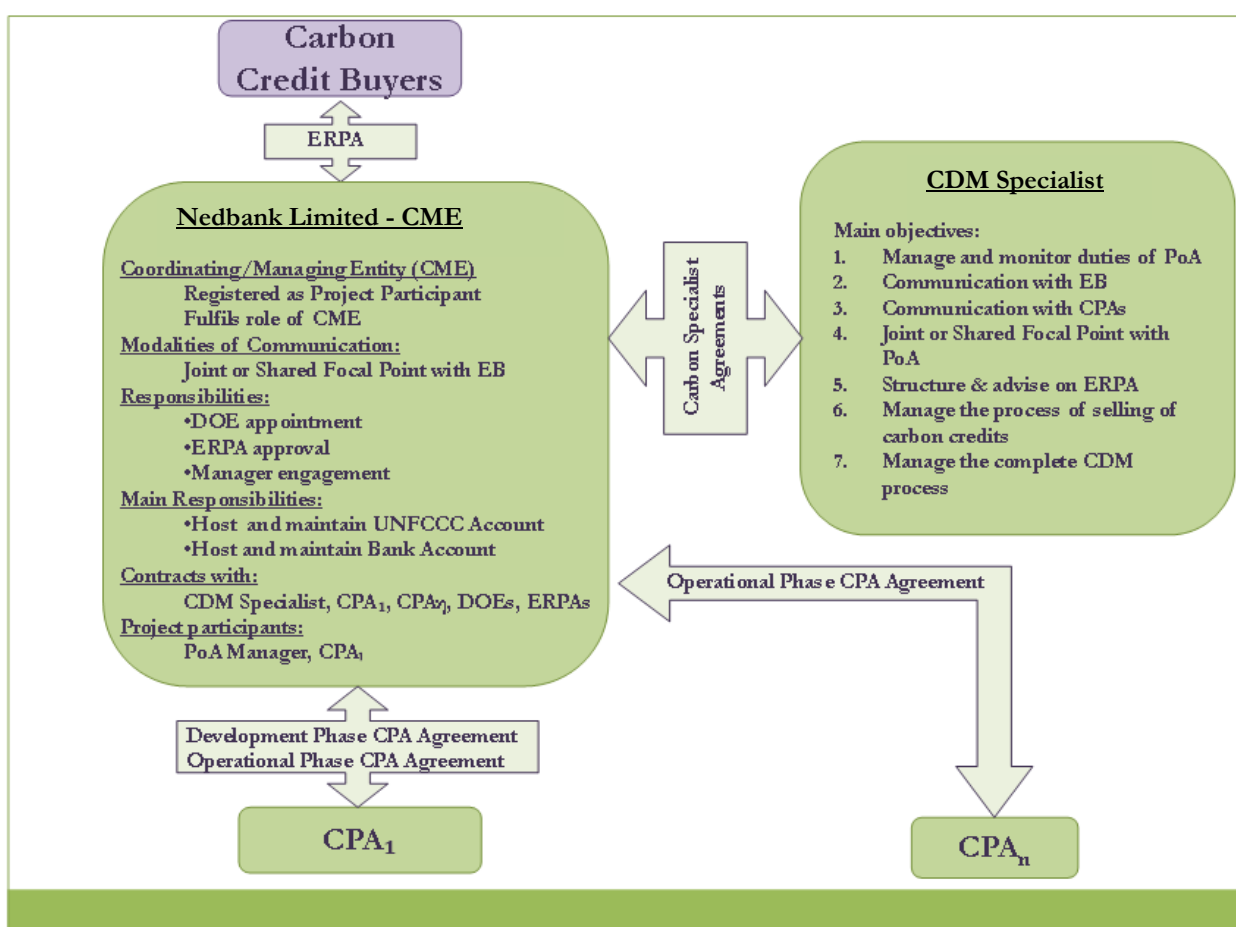
The database capturing points 1 to 9 above will be set up in a way that allows the user to easily extract information for the purposes of emission reduction monitoring and reporting. The records of points 10 to 12 will also be stored by the CME in hard copy and/or soft copy. Data will be archived for a minimum of two years after the 28 year crediting period has lapsed. Relevant data capture, verification and storage procedures will be followed in maintaining the data to ensure its accuracy, validity and completeness.

The database ensures that each CPA is uniquely defined. However, prior to the registration of each CPA under the PoA, the CME will confirm that the proposed CPA is not registered, or in the process of being registered, as a CDM project activity.



To ensure that each CPA is not a debundled component of another CPA or CDM project activity, the CME will follow EB 54 Annex 13 ‘Guidelines on assessment of debundling for SSC project activities’. The managing entity will ensure that the project boundaries of adjacent CPAs (with the same activity implementer) are not within 1 km of each other at the closest point.

The CME is responsible for identifying, registering, and managing all CPAs that will be registered under the proposed PoA. The CME will ensure that those operating the CPA are aware of, and have agreed that their activity is being subscribed to the PoA (through a signed agreement, as stipulated in section A.4.2.2.). This agreement will also define the ownership of the CERs. An illustration of the contractual agreement between the CME and the CPA is shown in the diagram below, which includes the entire commercial framework of the PoA.





A.4.4.2. Monitoring plan:

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The monitoring plan will ensure that each CPA's emission reductions are accurately monitored, recorded and reported. The monitoring plan will be specified in more detail in each CPA under section B.6 of the CPA-DD.

The CME has chosen to verify each CPA individually – no sampling will take place. The monitoring plan for parameters included in section E.7.1 will be implemented for each CPA with assistance from the CME as follows:

- The CPA implementer(s) will monitor and record all parameters included in section E.7.1 of this document
- The CME will provide guidance to the CPA implementer(s) on what monitoring is required for the PoA purposes and which data parameters should be collected in regards to emission reductions calculations.
- The CPA implementer(s) will provide recorded data to (the parameters of which are specified in section E.7.1 of this document) the CME, either directly into the database provided by the CME. Alternatively, if the information is provided in spreadsheets, scanned copies or by fax, the information will be entered into the database by the CME.

The CME will document and store all data provided by CPA implementer(s) in an online electronic database. The CPA implementer(s) will also keep its own records to ensure transparency and to provide a backup.

The online electronic database (developed by the CME), which will record the start and end dates of each monitoring period, as well as the emission reductions for each CPA during the monitoring period. This database will also contain each CPA's details, as specified in section A.4.4.1 of this document. This will ensure that the online database is transparent, that no double counting occurs, and that the status of verification can be determined anytime for each CPA.

Each CPA will produce a monitoring report at the end of its monitoring period. This report will contain all of the data relating to the CPA's emission reductions during the monitoring period. The monitoring reports should be submitted to the CME two months prior to verification. These reports will be checked by the CME and compiled into a single PoA monitoring report to be submitted to the DOE for verification.

The CME will inform all CPAs on when the annual verification of the programme will take place. The monitoring report will then be submitted to the DOE for verification. The records and documents pertaining to the monitoring and verification of each CPA will be maintained by the CME.

A.4.5. Public funding of the programme of activities (PoA):

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No public funding will be used in the development or in the implementation of this PoA.



SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

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The starting date of the PoA is the date of Global Stakeholder Participation (GSP) – 30/04/2012.

B.2. Length of the programme of activities (PoA):

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28 years 0 months.

SECTION C. Environmental Analysis

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

1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at SSC-CPA level

Environmental analysis will be done at a CPA level.

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

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Not applicable. Environmental analysis will be done at a CPA level. This section is intentionally left blank.

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):

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Not applicable. Environmental analysis will be done at a CPA level. This section is intentionally left blank.

SECTION D. Stakeholders' comments

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

1. Local stakeholder consultation is done at PoA level
2. Local stakeholder consultation is done at SSC-CPA level

Local stakeholder consultation will be done at a CPA level.

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

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Not applicable. Local stakeholder consultation will be done at a CPA level. This section is intentionally left blank.



D.3. Summary of the comments received:

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Not applicable. Local stakeholder consultation will be done at a CPA level. This section is intentionally left blank.

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

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Not applicable. Local stakeholder consultation will be done at a CPA level. This section is intentionally left blank.

SECTION E. Application of a baseline and monitoring methodology

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

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The approved baseline and monitoring methodology applied to the CPAs included in the PoA is AMS-II.C ‘Demand-side energy efficiency activities for specific technologies’, version 13.

The tool used in conjunction with this methodology is:

- ‘Tool to calculate the emission factor for an electricity system’ (version 02.2.1)

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

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Each CPA complies with the applicability criteria as set out in the selected methodology (AMS-II.C). This is shown in the table below.

Item	AMS II.C.	CPA
1.	<i>This methodology comprises activities that encourage the adoption of energy-efficient equipment/appliance (e.g., lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems) at many sites. These technologies may replace existing equipment or be installed at new sites. In the case of new facilities, the determination of baseline scenario shall be as per the procedures described in the general guidance to SSC methodologies under the section ‘Type II and III Greenfield projects (new facilities)’. The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year for electrical end use energy efficiency technologies. For fossil fuel end use energy efficient technologies, the limit is 180 GWh thermal per year in fuel input.</i>	Applicable Each CPA involves the installation of a number of energy efficient ventilation fans. These ventilation fans may replace existing ventilation fans or may be installed at new sites. The annual energy savings of each CPA will not exceed 60GWh _e , as stipulated by the eligibility criteria outlined in section A.4.2.2.
2.	<i>For each replaced appliance/equipment/system the rated capacity or output or level of service (e.g., light output, water output, room temperature and comfort, the rated output capacity of air-conditioners etc.) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.</i>	Applicable The applicability criteria stipulate that a CPA may only fall under the provisions of this PoA if this item is fulfilled (refer to section A.4.2.2).



3.	<i>If the energy efficient equipment contains refrigerants, then the refrigerant used in the project case shall be CFC free. Project emissions from the baseline refrigerant and/or project refrigerants shall be considered in accordance with the guidance of the Board (EB 34, paragraph 17). This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment/appliances.</i>	Not relevant to this PoA This is not applicable as ventilation fans do not contain refrigerants.
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Therefore, this PoA meets the applicability criteria of the selected methodology.

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

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The geographical boundary of the PoA is South Africa. The CPA is implemented in South Africa, as indicated in section A.4.2.1. According to version 13 of AMS-II.C., the project boundary is the physical, geographical location of each ventilation fan installed.

The GHG reduced through the CPAs under this PoA is predominantly CO₂. The reduction takes place through the avoidance of fossil fuels (predominantly coal) used in the production of electricity. CH₄ and N₂O are also reduced as a result of the project activity however; the quantity of these gases is much smaller. Therefore, CH₄ and N₂O are excluded from the project boundary in a conservative manner. The GHG emission sources taken into account in the baseline and project scenarios are shown in the table below.

	Source	Gas	Included?	Justification/Explanation
Baseline	Electricity generation, grid	CO ₂	Included	The main source of emissions in the baseline.
		CH ₄	Excluded	Excluded for simplification. This is conservative.
		N ₂ O	Excluded	Excluded for simplification. This is conservative.
Project	Electricity generation, grid	CO ₂	Included	The main source of emissions in the project activity.
		CH ₄	Excluded	Excluded for simplification.
		N ₂ O	Excluded	Excluded for simplification.

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

>>

This PoA covers the adoption of energy efficient ventilation fans through either the replacement of existing ventilation fans or the installation of new ventilation fans. According to AMS-II.C version 13, the baseline scenario can be one of the following:



1. If the project activity involves **replacement**:

Option 1 in paragraph 6 of the AMS-II.C is selected for the baseline. The baseline is the product of energy consumed by the existing ventilation fans and the emission factor of the national grid. This emission factor is calculated in accordance with the 'Tool to calculate the emission factor for an electricity system' (Version 02.2.1).

2. If the project activity involves **a new installation**:

The baseline is established using paragraph 19 of the 'General guidelines to SSC CDM methodologies' (version 17).

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 SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA):

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

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Additionality of the CPA needs to be demonstrated to show that in the absence of the CDM, the CPA would not occur. According to version 01 of the 'Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities', PoAs that consist of one or more small-scale projects as CPAs shall demonstrate additionality according to the requirements of attachment A to Appendix B of the 'Simplified modalities and procedures for small-scale CDM project activities'.

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

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As per section E.5.1 of this document, the CPA shall demonstrate additionality using attachment A to Appendix B of the 'Simplified modalities and procedures for small-scale CDM project activities'. Additionality will be demonstrated on a CPA level, for each individual CPA.

The CPA implementer shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions.

Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.

Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions. It is standard practice in South Africa for facilities to use conventional non-energy-efficient ventilation fans. There are no policies or schemes which support the installation of energy efficient ventilation fans in South Africa.

Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.



In accordance with EB 63 Annex 23, automatic additionality in the case of microscale project activities is not applicable to the CPA's in this PoA. This is because in the case of automatic additionality, the end users are households/ communities/ small and medium enterprises, and not facilities that will be targeted in this PoA. However, if in future these guidelines are changed and do become applicable to this PoA, the CME will request a deviation of the registered PoA and generic CPA.

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 SSC-CPA:

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As discussed in section E.1, the approved baseline and monitoring methodology AMS-II.C (Version 13) is applied to the installation of energy efficient ventilation fans at sites across South Africa.

The equations used to determine the emission reduction are provided in section E.6.2.

The methodological choices made regarding the 'Tool to calculate the emission factor for an electricity system' (Version 02.2.1) are as follows:

- In terms of data vintages, the ex ante option was chosen to calculate the simple OM. In this option a 3 year generation-weighted average are used for the grid power plants. Using this option also means that the emission factor is determined only once at the validation stage, thus no monitoring and recalculation is required during the crediting period.
- The simple operating margin emission factor ($EF_{grid,OMsimple,y}$) is chosen for the calculation method, seeing as low-cost/must-run resources constitute less than 50% of total grid generation in average of the five most recent years.
- For calculating of the combined margin emission factor: $w_{OM} = 0.5$ and $w_{BM} = 0.5$ (as specified by the applied tool – it is an 'other'-type project).

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

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The emission reductions of each CPA are calculated in accordance with the provisions under AMS-II.C version 13.

Baseline emissions:

The baseline emissions of each CPA are calculated using Option 1 of the applied methodology. The baseline emissions are calculated in using equation (1):

(Equation 1)

Where,

- Baseline emissions in year y (tCO₂e)
- Energy consumption in the baseline in year y (MWh)
- Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO₂/MWh)
- Average annual quantity of refrigerant used in the baseline to replace the refrigerant that has leaked (tonnes/year)



Global Warming Potential of the baseline refrigerant (tCO_2e/t refrigerant)

No refrigerant is used in the baseline so equation 1 simplifies to:

(Equation 1.1)

The energy consumption in the baseline is calculated using equation (2) of the applied methodology:

(Equation 2)

Where,

Number of fans replaced, for which the project energy efficient equipment is operating during the year y
Power of the baseline ventilation fans (MW)
Average annual operating hours of the ventilation fans (hours)
Average annual technical grid losses for the grid (transmission and distribution) during the year y

Project emissions:

The project emissions are calculated in using equation (5) of the applied methodology:

(Equation 5)

Where,

Project emissions in year y (tCO_2e)
Energy consumption in project activity in year y (MWh/year)
Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO_2/MWh)

The energy consumption in the project is calculated using equation (5.1) of the applied methodology:

(Equation 5.1)

Where,

Power of the project ventilation fans (MW)

There are no refrigerants used in the component project activity and therefore equation (6) of the applied methodology is not applicable.

Leakage:

No leakage is associated with the CPAs as in the case of the replacement, the existing ventilation fans are scrapped (this will be monitored in the PoA). This scrapping process will be documented and independently verified.



Emission reductions:

The emission reductions of the CPA are calculated using equation (7) below:

(Equation 7)

Where:

- Emission reductions in year y (tCO₂e)
- Baseline emissions in year y (tCO₂e)
- Project emissions in year y (tCO₂e)
- Leakage in year y (tCO₂e)

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

Data / Parameter:	
Data unit:	tCO ₂ e/MWh
Description:	Emission factor of the grid
Source of data used:	Calculated
Value applied:	1.0213
Justification of the choice of data or description of measurement methods and procedures actually applied :	The emission factor of the grid is calculated in accordance with the ‘Tool to calculate the emission factor for an electricity system’ (version 02.2.1). These calculations are provided in Annex 3.
Any comment:	As per the applied tool, this value can be calculated ex-ante.

Data / Parameter:	
Data unit:	MW
Description:	Power of the baseline ventilation fans
Source of data used:	Controlled performance tests on the existing fans
Value applied:	To be completed by the CPA implementer(s).
Justification of the choice of data or description of measurement methods and procedures actually applied :	A random sample of the existing fans will be tested to estimate the conservative energy savings for all of the fans used in this project activity. This is in accordance with paragraph (15) of AMS-II.C which states: ‘If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the “energy use” of an appropriate sample of devices installed’. Controlled performance testing determines fan performance in isolation of any specific installation and provides a direct fan-to-fan comparison for any fan. A characteristic performance curve can then be determined for each fan which can then be applied to investigate suitability for various installations in terms of flow rate, pressure and power consumption.
Any comment:	-

Data / Parameter:	
Data unit:	MW
Description:	Power of the project ventilation fans
Source of data used:	Controlled performance tests on the new fans



Value applied:	To be completed by the CPA implementer(s).
Justification of the choice of data or description of measurement methods and procedures actually applied :	A random sample of the new fans will be tested to estimate the conservative energy savings for all of the fans used in this project activity. This is in accordance with paragraph (15) of AMS-II.C which states: ‘If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the “energy use” of an appropriate sample of devices installed’. Controlled performance testing determines fan performance in isolation of any specific installation and provides a direct fan-to-fan comparison for any fan. A characteristic performance curve can then be determined for each fan which can then be applied to investigate suitability for various installations in terms of flow rate, pressure and power consumption.
Any comment:	-

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

E.7.1. Data and parameters to be monitored by each SSC-CPA:

Data / Parameter:	
Data unit:	-
Description:	Number of fans replaced, for which the project energy efficient equipment is operating during the year y
Source of data to be used:	Supplier invoices
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	The number of fans installed will be determined from supplier invoices.
QA/QC procedures to be applied:	No QA/QC procedures need to be applied.
Any comment:	To be completed by the CPA implementer(s).

Data / Parameter:	
Data unit:	hours/year
Description:	Average annual operating hours of the baseline ventilation fans
Source of data to be used:	Measured at project site.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be	Records will be examined annually to check for any fan downtimes. These downtimes will be factored into the emission reduction calculations during verification.



applied:	
QA/QC procedures to be applied:	It is assumed that the ventilation fans operate continuously but this shall be checked during the verification of the CPA.
Any comment:	To be completed by the CPA implementer(s).

Data / Parameter:	
Data unit:	-
Description:	Average annual technical grid losses for the grid (transmission and distribution) during the year y
Source of data to be used:	Eskom annual report
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.067
Description of measurement methods and procedures to be applied:	Not applicable.
QA/QC procedures to be applied:	Not applicable.
Any comment:	Eskom measures the losses on their system every year and publishes them in the annual report.

Data / Parameter:	
Data unit:	-
Description:	As per the requirements in AMS-II.C version 13, the scrapping process shall be documented.
Source of data to be used:	Independent company scrapping records.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	To be completed by the CPA implementer(s).
QA/QC procedures to be applied:	The scrapping of the replaced ventilation fans shall be independently verified, as per the requirements of the applied methodology.
Any comment:	To be completed by the CPA implementer(s).

Data / Parameter:	
Data unit:	-
Description:	Annual check of a sample of the installed fans to ensure that they are still operational.
Source of data to be	Physical confirmation



used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	The CME implementer(s) shall follow version 01 of the ‘General guidelines for sampling and surveys for small-scale CDM project activities’ to determine the fan sampling method. A random sampling method shall be applied.
QA/QC procedures to be applied:	Not applicable.
Any comment:	To be completed by the CPA implementer(s).

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

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The monitoring plan has been developed using the approved consolidated baseline and monitoring methodology AMS-II.C. The purpose of the monitoring plan will be to measure and record the energy savings of each CPA. Details of the CPA monitoring plan will be described in each CPA, whilst considering the following elements:

1. Monitoring Period

The monitoring period will start from the date of commissioning of the CPA. An annual monitoring report will be produced.

2. Monitoring Plan Management

The CPA facility manager is responsible for the effective implementation of the monitoring management plan. All elements of the monitoring plan will be supported by formal procedures and regular training of delegated personnel, as appropriate.

The CME is responsible for managing and monitoring the data set that generates the grid emission factor.

3. Data Monitored and Sources

For each CPA, all parameters included in E.7.1 will be monitored by the CPA implementer(s) and recorded electronically. The CPA implementer(s) will provide data on monitored parameters included in section E.7.1 to the CME. The CME will document and store all data related to parameters included in section E.7.1 provided by CPA implementing entities in an electronic database, while primary data will be stored by each CPA implementing entity.

The CME will establish and maintain an extensive database for each CPA wherein the following data will be recorded:

- Name of the CPA.
- Names of the site where the CPA is implemented.
- Location of the CPA including GPS coordinates.
- Name of the CPA developer.



- Contact details of the CPA developer including contact person, address, telephone and email address.
- Installed capacity and other relevant technical specification of the CPA.
- A list of the ventilation fans unique identification codes.
- Start date of the CPA.
- The commissioning date of the ventilation fans.

The CME shall also keep records of the following:

- The signed agreement with the CME to participate in the programme.
- During the crediting period, the verification status, monitoring reports and records for the CPA.
- Destruction/scraping records of the ventilation fans in case of replacement. The scrapping process shall be independently verified, as per the requirements if AMS-I.L.C version 13.

4. Storage of Data

All data collected will be archived electronically in two places for security purposes. Data will be consolidated and submitted to the CME database on a regular basis. All data will be kept by the CPA and the CME for at least two years after the end of the crediting period.

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)

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Date of completion of application: 26/04/2012

Contact information for the entity responsible for the application of the baseline and monitoring information:

Promethium Carbon (Pty) Ltd
Coral House
20 Peter Place
Bryanston 2021
Johannesburg
Telephone: +27 11 706 8185

This entity is not a project participant.



Annex 1

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

Organization:	Nedbank Limited
Street/P.O.Box:	135 Rivonia Road
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City:	Sandown
State/Region:	Gauteng
Postfix/ZIP:	2196
Country:	South Africa
Telephone:	+27 11 294 2268
FAX:	+27 11 295 2268
E-Mail:	carbon@nedbankcapital.co.za
URL:	www.nedbankcapital.co.za
Represented by:	Head: African Treasuries, Carbon and Financial Products Unit
Title:	Mr
Salutation:	
Last Name:	Whitfield
Middle Name:	
First Name:	Kevin
Department:	African Treasuries, Carbon and Financial Products
Mobile:	+27 82 901 5846
Direct FAX:	+27 11 295 2268
Direct tel:	+27 11 294 2268
Personal E-Mail:	kevinwh@nedbankcapital.co.za



Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding will be used in the development or in the implementation of this PoA.



Annex 3

BASELINE INFORMATION

Grid emission factor calculations

This section presents the calculations for the South African grid emission factor.

Step 1: Identify the Relevant Electricity Systems

This tool will serve project activities that prospect to displace grid electricity in South Africa. The 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 and that can be displaced without significant transmission constraints.

Similarly, a connected electricity system, e.g. national or international, is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints, but transmission to the project electricity system has significant transmission constraints.

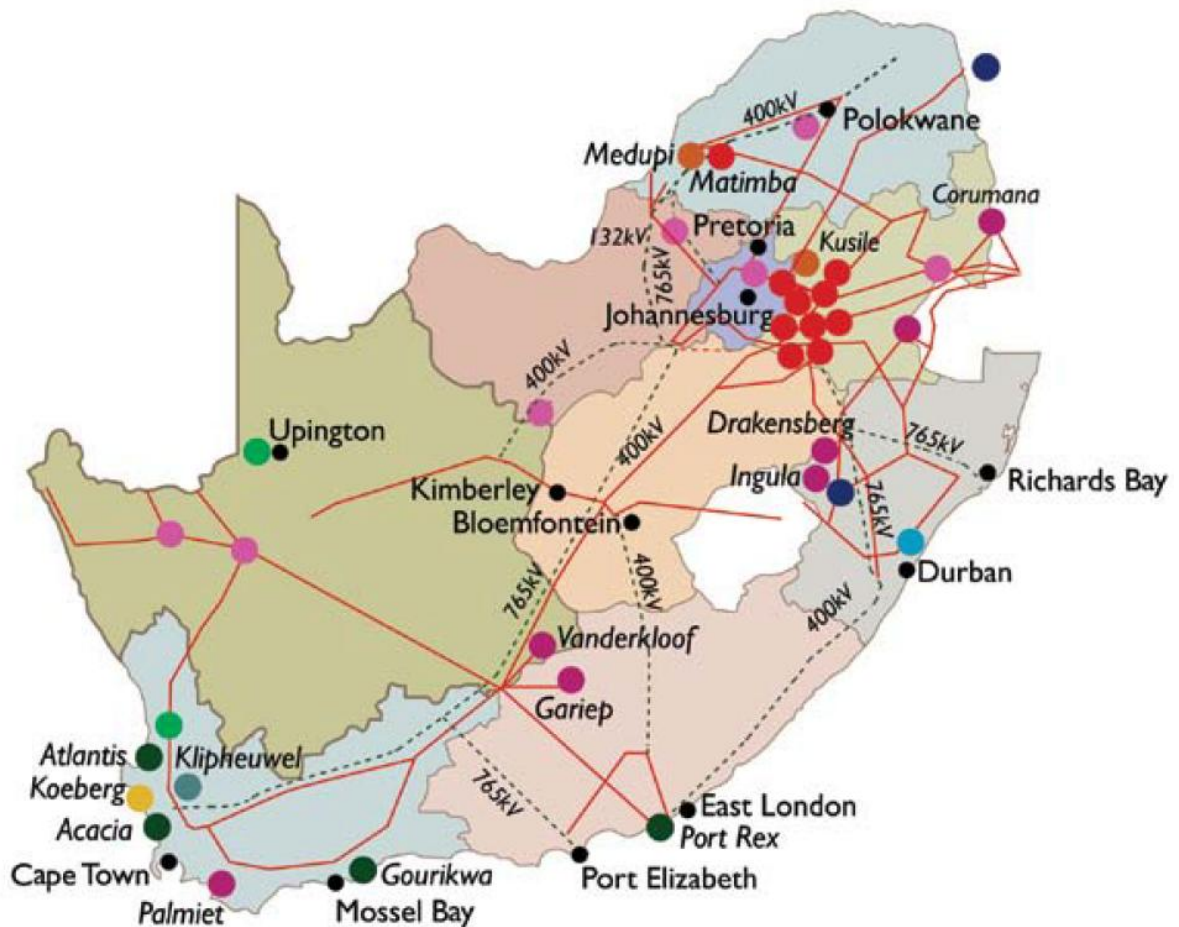
The DNA of South Africa has not published a delineation of the project electricity system and connected electricity systems. Also, the application of the criteria with regards to determining significant transmission constraints does not result in a clear grid boundary due to a lack of sufficient data. For these reasons the following was chosen for the reference system of this project:

- The project electricity system entails all the Eskom power plants in the South African electricity grid.
- Due to a lack of data available in the public domain (in order to evaluate significant transmission constraints), all other power stations (non-Eskom) and countries with power grids connected to South Africa, are treated as connected electricity systems, and emission factors for imports from these systems are conservatively assumed to be 0 tCO₂/MWh.

All electricity generated by the Eskom power stations is taken into consideration when calculating the grid emission factor; exports are not subtracted.

All the data for the Eskom power stations are obtained from the Eskom website, where they have a specific webpage dedicated to CDM grid emission factor related data (Eskom Holdings SOC Limited, 2011). This data includes commissioning dates, electricity generated, and fuel consumed.

Data for the imported electricity are obtained from the Eskom annual report, where “*Total purchased for the Eskom system (GWh)*” is shown in the “*Statistical overview*” table on pg. 324 of the report (Eskom Holdings SOC Limited, 2011).



Step 2: Chose Whether to Include Off-Grid Power Plants in the Project Electricity System

This step is optional according to the tool. The grid emission factor is calculated from only grid power plants (Option I). Off-grid power plants are not included in the calculations.

Step 3: Select a Method to Determine the Operating Margin (OM)

The OM is calculated using the simple OM method (Option a). The simple OM method can be used provided that the low-cost/must-run resources constitute less than 50% of the total grid generation in average of the five most recent years.

The average percentage of low-cost/must-run resources amount to 0.00% of the total grid generation for this project electricity system. Therefore, Option (a) is applicable.

In terms of data vintages, the *ex ante* option were chosen to calculate the simple OM. In this option a 3 year generation-weighted average are used for the grid power plants. Using this option also means that the emission factor is determined only once at the validation stage, thus no monitoring and recalculation is required during the crediting period.



The data used in OM calculations are for the 3 year period of 1 April 2008 – 31 March 2011 (Eskom financial year runs from 1 April – 31 March). This is the latest available data.

Step 4: Calculate the Operating Margin Emission Factor According to the Selected Method

The simple OM emission factor ($EF_{grid,OMsimple,y}$) 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. Hence, the hydro and nuclear power plants are excluded from the calculation of the OM.

Option A is used for calculating the simple OM. The calculations in this option are based on the total net electricity generation and a CO₂ emission factor of each power plant.

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 plant and an emission factor of each power plant, as follows:

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

Where:

- $EF_{grid,OMsimple,y}$ Simple operating margin CO₂ emission factor in year y (tCO₂/MWh)
- $EG_{m,y}$ Net quantity of electricity generated and delivered to the grid by power unit m in the year y (MWh)
- $EF_{EL,m,y}$ CO₂ emission factor of power unit m in year y (tCO₂/MWh)
- m All power units serving the grid in year y except low-cost/must-run power units
- y The relevant year as per data vintage chosen in Step 3

Determination of $EF_{EL,m,y}$

The emission factor for each power plant (m) was determined as follows (Option A1):

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y}$$

Where:

- $EF_{grid,OMsimple,y}$ Simple operating margin CO₂ emission factor in year y (tCO₂/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) fossil fuel type i in year y (GJ/mass or volume unit)
- $EF_{CO2,i,y}$ CO₂ emission factor of fossil fuel type i in year y (tCO₂/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 data vintage chosen in Step 3.



Electricity imports are treated as one power plant, as per the tool guidance.

The constants used in calculations appear in the table below.

Constants used in calculations

Constants		
NCV _{other bituminous coal}	19.9	GJ/T
NCV _{other kerosene}	42.9	GJ/T
EF _{CO2 other bituminous coal}	0.0895	tCO ₂ /GJ
EF _{CO2, other kerosene}	0.0708	tCO ₂ /GJ

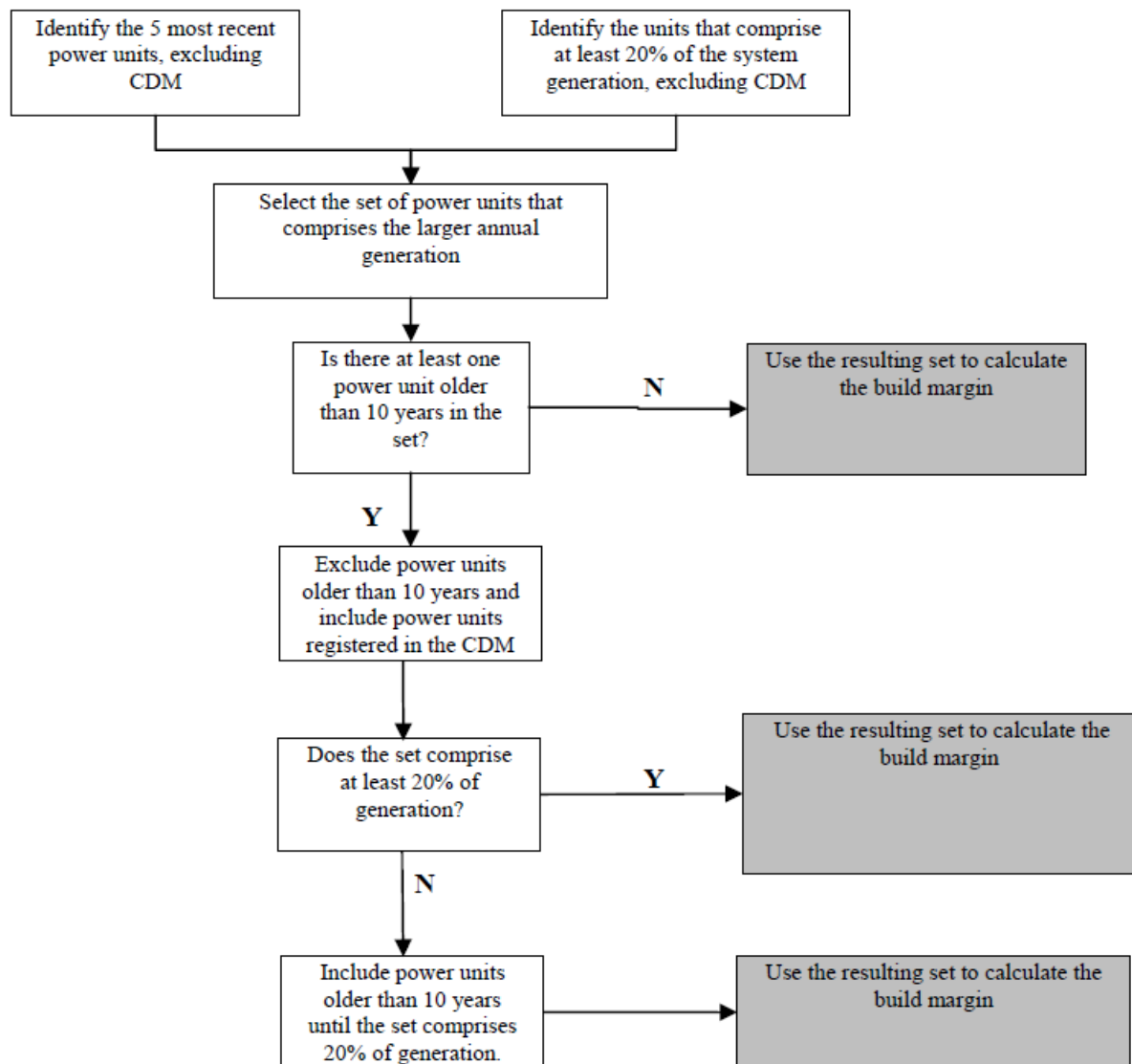
The OM is calculated as **1.0182** tCO₂e/ MWh.

Step 5: Calculate the Build Margin (BM) Emission Factor

In terms of vintage of data, one Option 1 was selected: 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.

The sample group of power units (*m*) used to calculate the build margin were determined as per the procedure delineated in the tool, consistent with the data vintages selected.

The following diagram summarizes the procedure of identifying the sample group:



The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$

Build margin CO₂ emission factor in year *y* (tCO₂/MWh)

$EG_{m,y}$

Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)

$EF_{EL,m,y}$

CO₂ emission factor of power unit *m* in year *y* (tCO₂/GJ)

m

Power units included in the build margin



y Most recent historical year for which power generation data is available.

The CO₂ 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 Option A1 using for y the most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

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:

$$EF_{EL,m,y} = \frac{\sum_i FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{EL,m,y}$	CO ₂ emission factor of power unit m in year y (tCO 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) fossil fuel type i in year y (GJ/mass or volume)
$EF_{CO_2,i,y}$	CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
$EG_{m,y}$	Net electricity generated and delivered to the grid by power unit m in year y (MWh)
m	All power plants/units serving the grid in year y except low-cost/must-run power plants/units
i	All fossil fuel types combusted in power plant/unit m in year y
y	The relevant year as per data vintage chosen in Step 3.

The BM is calculated as **1.0245** tCO₂e/ MWh.

Step 6: Calculate the Combined Margin (CM) Emission Factor

The combined margin factor is calculated as follows:

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

Where:

$EF_{grid,BM,y}$	Build Margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OM,y}$	Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
w_{OM}	Weighting of operating margin emissions factor (%)
w_{BM}	Weighting of build margin emissions factor (%)

The emission factors for the operating margin, the build margin, and the final combined margin appear in the table below.



CM emission factor

$EF_{grid,OM,y}$	1.0182
$EF_{grid,BM,y}$	1.0245
w_{OM}	0.5
w_{BM}	0.5
$EF_{grid,CM,y}$	1.0213



Annex 4

MONITORING INFORMATION

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