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

CONTENTS

Annexes

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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Title: Cogeneration and/or trigeneration at commercial sites.
Version: 02
Date: 30/12/2012

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 develop a series of cogeneration and/or trigeneration projects at commercial facilities. These projects will see the simultaneous production of electricity and cooling and/or heating, from a single fuel source – methane-rich natural gas. Each small-scale CDM programme activity (CPA) will cover a single commercial site, and will result in energy savings up to 60 GWh per year.

This PoA is based on AMS II.K. *Installation of co-generation or tri-generation systems supplying energy to commercial buildings*. A commercial facility is classified as the premises of a business. Only commercial facilities defined as the premises of a business enterprise excluding industrial facilities may be included in this PoA.
The Carbon Protocol of SA [1]will be responsible for the project documentation of the PoA and CPA, and will act as the managing entity of the PoA. The installation of the cogeneration and/or trigeneration systems will typically be managed by the owner(s) of each commercial site, hence forth referred to as the CPA implementer(s).

This small scale CDM programme is being developed to generate revenue from the certified emission reductions (CERs).

The PoA does not apply to the replacement of existing co-generation or trigeneration systems.

This PoA is applicable to two scenarios:

1. Replacement or supplementation of existing systems that supply electricity (grid or on-site generation) and cooling (e.g. chillers) and/or heating systems (e.g. boilers).
2. A new development where co-generation or trigeneration systems would not have been built. (i.e. electricity and cooling and/or heating systems would have been built and utilized).

The PoA restricts the existing system to electricity from the grid, which is common practice in South Africa and excludes on site captive power plants.

[1] The Carbon Protocol of SA is a registered not for profit organisation on which a platform for PoAs was created to perform the CME function. This PoA was initially (08/07/2012) webhosted with a different CME, Promethium Carbon, which has subsequently voluntary withdrawn as CME. Promethium Carbon is supportive of this new independent platform, creating a legal structure that for the duration each PoA can act in the best interest of the underlying CPAs. MTN became CPA1 implementer and has voluntary withdrawn as project participant, while the Carbon Protocol of SA became the Project Participant.

Various types and designs of co-generation or trigeneration facilities exist, and these are all valid under this programme as there are a number of technology suppliers in the cogeneration/trigeneration sphere. The PoA is written in a way so as to not limit the choice of technology provider on condition that the technology is in accordance with section A.4.2.1 of this PoA.

In the event that the project owner is not the owner of the facility, a contract will need to be established between the two entities. The contract must cover at least the following:

- Access/ availability of data
- Enforce the implementation of the monitoring plan
- Ownership of the credits must be specified to avoid double-counting.

The baseline scenario for baseline emission calculations shall depend on: (a) the source of electricity; and (b) the technology that would have been used to produce heating and/or cooling, in the absence of the project activity.

The following baseline options are applicable to this programme:

(a) Electricity is imported from the grid;
(b) Cooling (e.g. chilled water) is produced in a vapour compression system driven by electricity;
(c) Heating (e.g. hot water) is produced electricity.

The combination of the CPAs anticipated to join and the common practice in commercial facilities considering the cogeneration/trigeneration system it is unlikely that equipment will be transferred or gas re-used. Therefore this PoA does not allow, or include the calculations, for

- leakage from the transfer of displaced energy generating equipment from or existing equipment transferred to another activity
- Leakage from the storage or usage in another equipment – therefore the displaced refrigerant must be destroyed if it is a greenhouse gas as defined in Annex A of the Kyoto Protocol or in paragraph 1 of the Convention

In addition the PoA is restricted to the use of hot water and excludes the use of steam. Hot water consumption in commercial facilities is common while the use of steam is limited. The anticipated facilities participating under this PoA do not have a steam demand and therefore it is excluded from this PoA. Hot water demand in the baseline is restricted to the use of electricity as energy source.

2. Policy/measure or stated goal of the PoA

The goal of this PoA is to improve the energy efficiency of commercial sites across South Africa. The PoA is written for South Africa, but is envisaged that other countries may be added to the Program in terms of the provisions of EB 60 Annex 26 Paragraph 6.

The historically low cost of electricity means that carbon intensive electricity is cheaper than any other source of power. This has made it difficult for energy efficiency projects to compete with coal based power[2]. This PoA will provide commercial entities with a framework on which to overcome these barriers.

The PoA makes a positive contribution to sustainable development. The South African Designated National Authority (DNA) evaluates sustainability in three categories: economic, environmental, and

[2] Department of Water and Environmental Affairs. (2010). *National Climate Change Response Draft Green Paper, pg 13, para. 5.* Retrieved from South Africa Government Online: http://www.environment.gov.za

social. The contribution of the programme towards sustainable development is discussed below in terms of these three categories:

Environmental

This programme 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 a predominantly coal-fired grid, which will result in a reduction in all of the negative impacts associated with coal mining. These impacts include: the impact of coal mining, the utilisation of scarce water resources, SO_2 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. Developing a series of cogeneration and/or trigeneration projects at commercial facilities in South Africa will reduce the pressure on energy infrastructure, thereby making important contributions to the country's economic sustainability.

There will be a transfer of knowledge from the countries supplying the cogeneration and/or trigeneration systems to South Africa. There is no technology transfer from any Annex-1 party.

Social

The programme will create jobs in the construction and operations phases of the programme.

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

South Africa has no mandatory requirements to implement cogeneration and/or trigeneration systems. The CPA implementer(s) will voluntarily install the new technology. The CME has confirmed that the PoA is a voluntary activity.

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

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The Carbon Protocol of SA is the managing entity of the PoA. The contact details of the Carbon Protocol of SA are provided in Annex 1.

The project participants being registered in relation to the PoA are provided in the table below:

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)	Carbon Protocol of SA[3] (private)	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 (Latitude: 22^0 S to 35^0 S. Longitude: 16^0 E to 33^0 E)[4].

[3] The Carbon Protocol of SA is a registered not for profit organisation on which a platform for PoAs was created to perform the CME function. This PoA was initially (08/07/2012) webhosted with a different CME, Promethium Carbon, which has subsequently voluntary withdrawn as CME. Promethium Carbon is supportive of this new independent platform, creating a legal structure that for the duration each PoA can act in the best interest of the underlying CPAs. MTN became CPA1 implementer and has voluntary withdrawn as project participant, while the Carbon Protocol of SA became the Project Participant.

[4] http://en.wikipedia.org/wiki/South_Africa

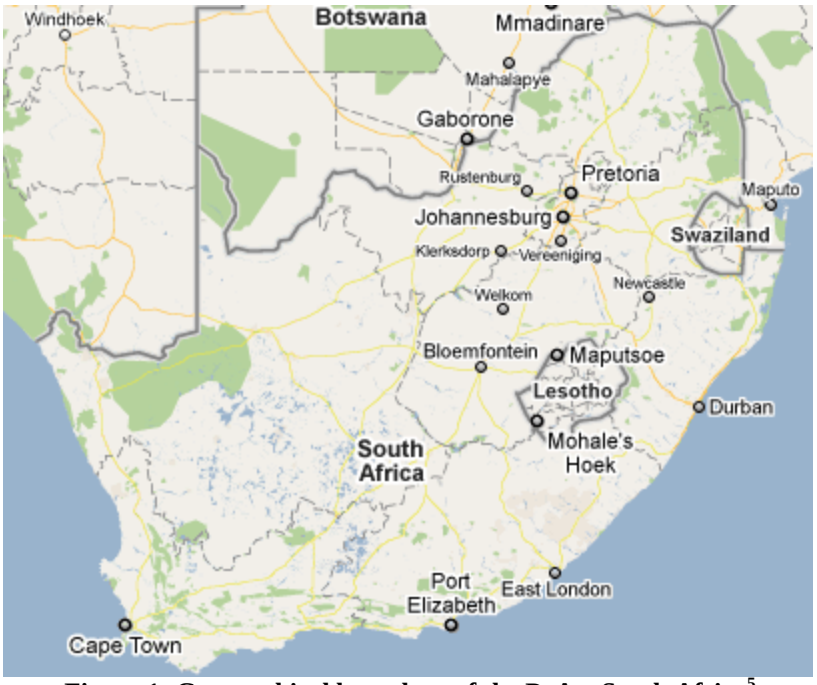

Figure 1: Geographical boundary of the PoA – South Africa[5]

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 cover a single commercial site in South Africa. The site may comprise one or a number of individual buildings. The CPA will involve the implementation of a new onsite cogeneration and/or trigeneration project. The system will replace or supplement either: the operation of (a) existing systems that supply and cooling and/or heating systems, or (b) electricity and cooling and/or heating systems that would have been built and utilized.

In accordance with the methodology, the energy savings caused by a single project activity may not exceed the equivalent of 60 GWh per year. A maximum saving of 60 GWh is equivalent to maximum savings of 60 GWhe of electricity consumption or maximum savings of 180 GWhth of fuel consumption, i.e., for calculation of maximum savings allowable per year, 1 GWhe equals 3 GWhth.

Cogeneration/trigeneration

Cogeneration is the simultaneous production of power and heat from a single fuel source. Trigeneration is the extension of cogeneration to include cooling. Due to the nature of the project (i.e. it is not a technology specific PoA), the precise technology employed by each CPA may vary. The technology employed by each CPA is described in further detail below.

Power generation

[5] Retrieved from http://maps.google.co.za/maps

- Electricity may be generated using internal combustion engines that will convert fuel to electricity. The internal combustion engines are spark ignition engines operating on the same principle as normal petrol engines.
- Electricity may also be generated using fuel cell technology. In this case fuel may be used in an electrochemical cell to convert chemical energy to electric energy, heating and cooling.

Fuel

- The fuel that will be utilised will be natural gas. For the purpose of this programme, natural gas is defined as a gas which consists primarily of methane and which is generated from: (i) natural gas fields (non-associated gas), (ii) associated gas found in oil fields. It may be blended up to 1% on a volume basis with gas from other sources, such as, *inter alia*, biogas generated in biodigesters, gas from coal mines, gas which is gasified from solid fossil fuels, etc.[1]

Heating

- Heat exchangers may be installed to utilise the waste heat from the internal combustion engines or fuel cells. These heat exchangers may produce hot water , which may be used to meet all or part of the heating requirement on the commercial site.

Cooling (in the case of trigeneration)

- In the case of trigeneration, absorption chillers may also be installed.
    - These chillers operate on thermal energy from the power generator(s) - heat that would otherwise have been lost to the atmosphere.
    - The absorption chillers produce chilled water, which will be used to meet all or part of the cooling demand in the commercial site.
    - The absorption chillers may contain refrigerants, but only if such refrigerants:
        - Have no global warming potential (GWP);
        - Have no ozone depleting potential (ODP) and
        - Are not mandated by the host country's laws or regulations (as stipulated by version 01 of methodology AMS II.K.).

Baseline

The CPA implementer needs to choose the appropriate baseline in accordance with the methodology.

The baseline scenario for baseline emission calculations shall depend (a) on the source of electricity and (b) the technology that would have been used to produce heating and/or cooling, in the absence of the project activity. The following baseline options are applicable to this methodology:

(a) Electricity is imported from the grid;
(b) Cooling (e.g., chilled water) is produced in a vapour compression system driven by electricity;
(c) Heating (e.g., hot water) is produced usingelectricity.

The appropriate baseline scenario must be selected from one of the following scenarios:

(a) Replacing/supplementing existing systems: The project consists of the installation of a new cogeneration or trigeneration system that replaces or supplements the operation of existing

systems that supply grid electricity and cooling (e.g., chillers) and/or heating systems (e.g., boilers). In such cases the baseline scenario is defined as either:

(i) If the total annual consumption of energy (electricity, cooling and heating) by the consuming commercial buildings does not increase by more than 20% from the established baseline values during the crediting period then the baseline scenario is the continuation of the operation of the existing systems and baseline emissions are established from the characteristics of the existing systems using data from the immediately prior three years (to the date of project start up);

(ii) If during the crediting period, total annual consumption of energy (electricity, cooling and heating) by the consuming commercial building does increase by more than 20% from the established baseline values then one of two options are applicable:

- If it can be demonstrated, using the related and relevant procedures prescribed in the SSC general guidance, that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then such systems can be continued to be used for determining baseline emissions;
- If it cannot be demonstrated that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then the Baseline Reference Plant Approach, as defined below shall be used.

(iii) If, irrespective of total annual energy consumption of baseline or project scenarios, it is determined that new and more efficient systems (as compared to the existing systems) would have been installed in the absence of the project activity (for example, due to the baseline equipment reaching the end of its useful life at any point during the crediting period) then the Baseline Reference Plant Approach, as defined below, shall be used.

(b) Replacing systems that would have been built: The project consists of the installation of a new cogeneration or trigeneration system that replaces the operation of electricity and cooling and/or heating systems that would have been built and utilized. In such cases the Baseline Reference Plant Approach, as defined below, shall be used to define the baseline scenario.

Baseline Reference Plant Approach

In cases where the baseline scenario consists of the installation of new cooling and/or heating systems and/or the utilization of new electricity sources, a Reference Plant shall be defined as the baseline scenario. The Reference Plant shall be based on common practice for similar capacity, new heating and cooling systems and sources of electricity in the same commercial sector **and in the same country or region as the project. The identification of the Reference Plant should** exclude plants implemented as CDM project activities. In cases where no such plant exists within the region, the economically most attractive technology and fuel type should be identified among those which provide the same service (i.e., the same or similar power, heat and/or cooling capacity), that are technologically available, and that are in compliance with relevant regulations.

The efficiency of the technology should be selected in a conservative manner, i.e., where several technologies could be used and are similarly economically attractive, the most efficient technology

should be defined as the baseline scenario. In addition, the least carbon intensive fuel type should be chosen in case of multiple fuels being possible choices.

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

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The eligibility criteria have been developed by the CME of this PoA and are based on the requirements in the "*Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA*" (Version 01.0, EB65 Annex 3). Further to this, the SSC-CPA(s) must also comply with the applicability criterions of AMS.II.K methodology as defined in section E.2 of the PoA-DD.

The CPA will be assessed against this list of criteria by the CME at the time when the CPA applies to enrol in the PoA

The eligibility criteria for including each CPA in this PoA are given below:

Eligibility Criteria developed by the CME		Evaluation procedure adopted by CME
(a)	*The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;*	The geographic boundary set for the PoA is South Africa (host country). The SSC-CPA location is verified against this by the CME. The details of the SSC-CPA location provided by the project participant shall be crosschecked through the description in CPA-DD or any of the other listed documents: • Detailed project report • Land documents with clear definition of the project location • EPC/ Purchase Order Letter of Intent with the site location details • Any Statutory Approvals / clearance received for the project having the mention of project location details
(b)	*Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);*	The double counting of emission reductions occur when the SSC-CPA part of the present PoA has been registered or has proposed to register under the CDM of the UNFCCC or any other voluntary scheme for availing GHG emission reduction benefits. Should such a case occur, then the CME will not proceed with inclusion of the corresponding SSC-CPA under the proposed PoA. In order to avoid the same, the CME shall assign a Unique Identification Number to the SSC-CPA(s) and shall cross verify with the following documents / sources at the time of SSC-CPA inclusion to the PoA and submit one of the below to the DoE at the time of validation/ verification: • Project location with any of the documents mentioned in point (a) • Cross-checking of the SSC-CPA geo co-ordinates. • Comparing between the CME database and the list of project activities that have submitted prior consideration for CDM, that are under validation,

		registered, rejected or withdrawn available on the UNFCCC website. • Undertaking from the SSC-CPA project developer.
(c)	*The specifications of technology/ measure including the level and type of service, performance specifications including compliance with testing/ certifications;*	The technology / measure allowed under the PoA must be the installation of new natural gas based cogeneration or tri-generation systems that simultaneously produce electricity and cooling (e.g. chilled water) and/or heating (e.g. warm or hot water) for supplying such energy to commercial or non-industrial buildings. For the purpose of this programme, natural gas is defined as a gas which consists primarily of methane and which is generated from: (i) natural gas fields (non-associated gas), (ii) associated gas found in oil fields. It may be blended up to 1% on a volume basis with gas from other sources, such as, *inter alia*, biogas generated in biodigesters, gas from coal mines, gas which is gasified from solid fossil fuels The system may replace or supplement either: the operation of (a) existing systems that supply electricity (grid or on-site generation) and cooling (e.g. chillers) and/or heating systems (e.g. boilers) or (b) electricity and cooling and/or heating systems that would have been built and utilized. If the system is replacing or supplementing (a)- an existing system, then the existing system must have been in operation for at least the immediately prior three years, to the start date of the project activity, in order to ensure that adequate baseline performance data are available. Onsite captive power plants are excluded and the existing system has to be grid connected. Facilities using or producing steam is excluded from this PoA. The design, layout and temperatures of the water streams will serve as confirmation. The methodology does not apply to the replacement of existing co-generation or trigeneration systems. Various types and designs of co-generation or trigeneration facilities exist, and these are all valid under this programme. To verify the same, the CME shall check the SSC-CPA technology adopted with the aid of one or more of the following documents: • Detailed Project Report • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Project commissioning certificate

(d)	*Conditions to check the start date of the CPA through documentary evidence;*	The start date shall be considered to be the date on which the SSC-CPA project participant has committed to expenditures related to the implementation or related to the construction of the SSC-CPA and should not be before the webhosting date of 12/07/2011. To verify the same, the CME shall check the date of the SSC-CPA EPC contracting/ purchase order placement / appropriate documentary evidence by the project participant. Further it is verified that these activities have happened after the commencement of PoA validation.
(e)	*Conditions that ensure compliance with applicability and other requirements of single or multiple methodology/ies applied by CPAs;*	Each CPA must meet the applicability criteria for methodology AMS-II-K version 01.0.): This methodology applies only to the installation of natural gas based co-generation or tri-generation facilities that simultaneously produce electricity and cooling (e.g. chilled water) and/or heating (e.g. hot water) for supplying such energy to commercial, non-industrial, buildings. This methodology only applies to commercial, non-industrial applications that comprise energy efficiency measures implemented through integration of a number of utility provisions (for example, integrating power, heat and cooling systems). Industrial facilities cannot apply this methodology. To verify the same, the CME shall check the SSC-CPA is a commercial, non-industrial applications with the aid of one or more of the following documents: • Annual report or company website • Signed declaration from the project participant The CME shall also check the SSC-CPA technology adopted and fuel used with the aid of one or more of the following documents: • Detailed Project Report • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Project commissioning certificate The methodology is applicable to installation of new cogeneration or tri-generation systems that replace or supplement either: the operation of (a) existing systems that supply electricity (grid or on-site generation) and cooling (e.g. chillers) and/or heating systems (e.g. boilers) or (b) electricity and cooling and/or heating systems that would have been built and utilized. The CME will verify the compliance through

		• Detailed Project Report • Existing system specification, if relevant • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies The methodology does not apply to the replacement of existing co-generation or trigeneration systems. The PoA does not allow the transfer of energy generating equipment to or from another project. The CME will verify compliance through • Detailed Project Report • Existing system specification, relating to electricity, heating and cooling demand. For this PoA, if it is identified that the baseline situation is the continued use of existing system then the existing system must have been in operation for at least the immediately prior three years, to the start date of the project activity, in order to ensure that adequate baseline performance data are available. The CME will verify compliance through: The historic records of power consumption and performance for three years prior to project implementation. This methodology only applies to commercial, non-industrial applications. Projects that comprise energy efficiency measures implemented through integration of a number of utility provisions (for example, integrating power, heat and cooling systems) of an industrial facility cannot apply this methodology The CME will verify this through the review of the • Detailed Project Report For the purpose of this methodology, natural gas is defined as a gas which consists primarily of methane and which is generated from: (i) natural gas fields (non-associated gas), (ii) associated gas found in oil fields. It may be blended up to 1% on a volume basis with gas from other sources, such as, *inter alia*, biogas generated in biodigesters, gas from coal mines, gas which is gasified from solid fossil fuels The CME will verify compliance through review of the Detailed Project Report including technical specifications such as the fuel source supplier and composition • Any chilled water/cooling, hot water/heat and electricity produced by the cogeneration or trigeneration

		system must be used on-site (within the project boundary) to meet all or part of the energy demand. To verify the same, the CME shall check the SSC-CPA technology adopted with the aid of one or more of the following documents: • Detailed Project Report including a clear demarcation of existing and new systems • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Project commissioning certificate • The energy savings caused by a single project activity may not exceed the equivalent of 60 GWh per year. To verify the same, the CME shall check the SSC-CPA technology adopted with the aid of one or more of the following documents: • Detailed Project Report • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Project commissioning certificate • This project activity can include installation of cooling equipment which use refrigerants only if such refrigerants have no ozone depleting potential (ODP). South Africa became a signatory of the Montreal Protocol in January 1990. This international agreement was put in place to control the production and the use of ozone-depleting substances. The re-use of refrigerant from displaced equipment is excluded. The CME will confirm if the displaced refrigerant is a greenhouse gas as defined in Annex A of the Kyoto Protocol or in paragraph 1 of the Convention, and if so, proof of destruction must be provided. To verify the same, the CME shall check the SSC-CPA technology adopted with the aid of one or more of the following documents: • Detailed Project Report • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Declaration from the project participant or

		technology provider • This programme is only applicable to project activities where the CPA implementer is the owner of the facility where the co-generation or trigeneration system is being implemented or a contract between the project owner and consumer of the energy must be in force, during the crediting period, specifying that only the facility generating the energy can claim CERs from the emissions displaced by the subject project To verify compliance the CME shall check the SSC-CPA is a commercial, non-industrial applications with the aid of one or more of the following documents: • Annual report or company website • Signed declaration from the project participant • Contracts between project owner and the consumer of energy Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas outside of the project boundary shall be considered, as per the guidance provided in the leakage section of ACM0009. In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero. Compliance will be verified by reviewing the Detailed project report on the source of the natural gas and the relevance of leakage for the project No other methodologies will be used. Each CPA must also meet the applicability criteria for the following tools: Tool to calculate the emission factor for an electricity system (Version 02.2.1) Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (Version 02) 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption', (Version 01) The CME to verify the same shall take an undertaking from the SSC-CPA implementing entity at the time of inclusion to the PoA.

		Further the justification to how the chosen methodology is applicable to the SSC-CPA is given in detail in section E.2 of this PoA.
(f)	*The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality;*	Each CPA shall prove additionality in accordance to "Guidelines on the demonstration of additionality of small-scale project activities" EB 68, Annex 27. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to the existence of at least one of the following barriers: • Investment barrier • Technological barrier • Barrier due to prevailing practice • Other barriers Additionality will be demonstrated at the CPA level in the CPA-DD and checked by the CME. The CPA implementer is to provide evidence to prove the existence of the barrier as well as an explanation as to how the CDM alleviated the existence of the barrier. In the case of proving the **investment barrier**, the CPA implementer shall use Equity IRR or other appropriate indicator or apply a benchmark analysis or may use the framework financial calculation sheet provided. In the case of proving the **technology barrier**, the CPA implementer may confirm this through an independent report including but not limited to: • performance uncertainty or • low market share of the new technology adopted for the project activity, or • the demonstration of nonavailability of human capacity to operate and maintain the technology, or • lack of infrastructure to utilize the technology, or unavailability of the technology, or • high level of technology risk. In case of the proving the **prevailing practice barrier**, the demonstration should include, but not be limited to, that the proposed project is among the first of its kind in terms of technology, geography, sector, type of investment and investor or market In case of demonstrating other barriers the demonstration should include information about institutional barriers or limited information, managerial resources, organizational capacity, or capacity to absorb new technologies. Thus in accordance with the above ruling, at the time of

		SSC-CPA inclusion, the additionality of the SSC-CPA shall be evaluated on the basis that if the proposed SSC-CPA(s) meets the eligibility criteria in section E.5.2 of the PoA, the SSC-CPA shall be deemed additional.
(g)	*The PoA-specific requirements stipulated by the CMEs including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;*	Local stakeholder participation will be conducted on a CPA level. The minimum requirements are to invite comments from the local stakeholders by publishing newspaper articles in the local papers in both English and the native language, describing the project and informing stakeholders of the registration of the project under the CDM. The CPA implementer must provide copies of the newspaper to the CME. The environmental impact analysis will be conducted at a CPA level in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).
(h)	*Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);*	The target group is commercial buildings in South Africa. In the case that the CPA is in existing facility then either of • Detailed Project Report • Technology offer along with the specifications provided by the supplier/ Tender form • Purchase order copies • Project commissioning certificate or • An undertaking from the CPA implementer can be provided as supporting document to the CME. There are no specific distribution mechanisms. Not applicable
(i)	*Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;*	No sampling will be done within the PoA. Not applicable
(j)	*Where applicable, the conditions that ensure that CPA in aggregate meets the small-scale or micro-scale threshold criteria (please refer to the latest approved version of the "Guidelines for demonstrating additionality of microscale project activities" and the latest approved version of the "General Guidelines to SSC CDM methodologies" and remain within those thresholds throughout the crediting period*	The energy savings caused by a single project activity may not exceed the equivalent of 60 GWh per year. A maximum saving of 60 GWh is equivalent to maximum savings of 60 GWhe of electricity consumption or maximum savings of 180 GWhth of fuel consumption, i.e. for calculation of maximum savings allowable per year, 1 GWhe equals 3 GWhth. If a project activity aims to achieve energy savings at a scale of no more than 20 gigawatt hours per year then *latest approved version of the "Guidelines for demonstrating additionality of microscale project activities"* must be followed as demonstrated in E.5.2 below.

	of the CPA;	Each CPA must be approved by the CME to ensure this condition prior to its incorporation into the PoA. CPA implementer to provide baseline data and calculation to the CME
(k)	*Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories (please refer to the latest approved version of the "Guidelines on assessment of debundling for SSC project activities");*	The CPA must meet the requirements for the debundling check for the small-scale (SSC) project category. The CME will confirm that the steps for the debundling check have been taken, and will keep record of the conclusion. Debundling for a PoA is determined according to the following rule: A proposed small-scale project activity shall be deemed to be a debundled component of a large scale activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity: a. with the same project participants; b. in the same project category and technology/measure; c. registered within the previous 2 years; and d. whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point. (EB 54, Annex 13, paragraph 2). However, if the combined size of proposed small-scale CPAs (that are deemed to be debundled components of a large-scale CPA) does not exceed the relevant limits for that type of small-scale project, the bundle will be eligible to use the simplified modalities and procedures: If a proposed small-scale CPA of a PoA is deemed to be a debundled component, but the total size of such an activity combined with the previous registered small-scale CDM project activity does not exceed the limits for small-scale CDM project activities as set out in paragraph 6(c) of the decision 17/CP.7, the project activity can qualify to use simplified modalities and procedures for small-scale CDM project activities (EB 54, Annex 13, paragraph 3).
(l)	*Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance.*	The CME will investigate the facts in each CPA and in each CPA-DD include a confirmation that no Official Development Assistance will be involved or diverted. The latter must be substantiated with an official statement from the CPA implementer that will be provided and stored by the CME. The CPA implementer to provide confirmation of no Official Development Assistance to the CME

(m)	*Additional CME requirement.*	In the event that the project owner is not the owner of the facility, a contract will need to be established between the two entities. The contract must cover at least the following: • Access/ availability of data • Enforce the implementation of the monitoring plan • Ownership of the credits must be specified to avoid double-counting. The CME will either need documentation to verify that the project owner is the owner of the facility or see a contract between the project owner and facility owner.

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):

>> The following shall be demonstrated here:

(i) The proposed PoA is a voluntary coordinated action;

The proposed PoA is a voluntary coordinated action. There are no mandatory policies/regulations in South Africa that enforce the installation of cogeneration or trigeneration systems at commercial sites. South African energy policy allows for the voluntary installation of cogeneration or trigeneration systems. The managing entity of the PoA and the CPA implementer(s) are voluntary project participants.

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

The small scale CDM programme activity is developed in order to generate revenues from the certified emission reductions (CERs) resulting from the programme as well as reducing risks and barriers for the underlying CPAs. The CER revenues make it possible for the CPA under the platform to use several services to realise a faster roll out for natural gas cogeneration/trigeneration systems for commercial buildings. As such it is a voluntary coordinated action initiated by the CME. The natural gas based "Cogeneration and/or /trigeneration at commercial sites" programme activity is a commercial initiative solely based on expected CER revenue.

The programme activity will be operated from revenues resulting from the sale of carbon credits and contributions from CPA implementers seeking access to CER revenues to enhance their market position.

There are no mandatory policies and/or regulations in South Africa that mandates the installation of gas fired cogeneration or trigeneration systems. The "Policy to support the Energy Efficiency and Demand Side Management" by the Department of Energy in South Africa does not mention cogeneration or trgeneration systems (website http://www.energy.gov.za/files/policies/Standard_Offer_Policy.pdf). It is standard practice in South Africa for commercial sites to use grid electricity for base load supply. There are no policies or schemes which supports cogeneration and/or trigeneration at commercial sites in South Africa. MTN sponsored the development of a new small scale methodology AMS II K demonstrating a need for CDM and a PoA to overcome the barrier. Except for

MTN with one stand alone project and CPA1 t there is no rollout of either cogeneration or trigeneration at commercial facilities. Expressions of interest has already been received for subsequent CPAs should the PoA successfully register.

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

Not applicable.

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

Not applicable.

Conclusion:

1. The programme activity is a voluntary initiative.
2. The PoA is not implementing any mandatory policy/regulation requirements in South Africa which enforces the use of a cogeneration and/or trigeneration system.

Hence, this PoA will enable a number of users to opt for cogeneration and/or trigeneration systems. In the absence of the CDM, the proposed voluntary measures would not have been implemented, making this PoA additional.

End users (e.g., building owners/tenants) and CPA implementers participating in CPAs under the PoA will do so through a voluntary collaboration with the Carbon Protocol of SA.
On a CPA level additionality will be proven for each CPA as per section E5.1 and E.5.2 of this PoA-DD.

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

A.4.4.1. Operational and management plan:

>>

The CME for this programme is Carbon Protocol of SA. Carbon Protocol of SA is hosting a platform for PoAs under the Kyoto Protocol. This is an open platform for which the Carbon Protocol of SA will be the CME.

Each CPA will follow the CME manual. The manual is designed to allow for the execution of the requirements of the rules of the CDM, the PoA-DD and CPA-DD, as well as the Operational Agreement.

The implementation of the Management System is the shared responsibility of the Carbon Protocol of SA, MTN South Africa and Promethium Carbon. The PoA is managed by a Management Committee in accordance with the roles agreed to in the Operational Agreement.

The Carbon Protocol being responsible for developing and implementing a management system, has drafted a CME manual that included the following:

1) A definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies.

2) Records of arrangements for training and capacity development for personnel.

3) Procedures for technical review of inclusion of CPAs.

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

5) Records and documentation control process for each CPA under the PoA which will include:

   a) A central database allowing for the transparent management of information related to all CPAs;
   b) Providing each CPA with a monitoring plan, described in the PoA Documents;
   c) Overseeing the installation of monitoring instruments and systems, where applicable;
   d) Ensuring that all data will be archived;
   e) Develop a document and record management process;
   f) Ensuring that a representative from each CPA will be suitably trained on the applications of the monitoring plan; and,
   g) Measures for continuous improvement of the PoA management system[6].

The management system will be implemented upon successful registration of the PoA. The Carbon Protocol of SA will be responsible for the maintenance of the management system.

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

Carbon Protocol of SA will be responsible for data collection and archiving.
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	
1.	Name of the CPA
2.	Name of the CPA developer
3.	Contact details of the CPA developer including contact person, address, telephone and/or email address
4.	Installed capacity and other relevant technical specifications of each CPA
5.	Location of the CPA (e.g. GPS coordinates)

[6] Project Standard, EB65, Annex 3, Clause 17

6.	Project start date of the CPA as defined in EB70 Annex 07
7.	The commissioning date of the equipment
8.	The crediting period for each CPA;
9.	The signed agreement with the CME to participate in the programme
Data during crediting period	
10.	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 a 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.
Each CPA implementer will sign a declaration stating that the CPA has not been already registered either as a CDM project activity or as a CPA of another PoA.

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 co-generation/ tri-generation at commercial sites 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 crosschecking 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 SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.

The CPA must meet the requirements for the debundling check for the small-scale (SSC) project category.

In accordance with EB 54, Annex 13 " *Guidelines on assessment of debundling for SSC project activities*" for the purposes of registration of a PoA a proposed small-scale CPA of a PoA shall be

deemed to be a de-bundled component of a large scale activity if there is already an activity, which satisfies both conditions (a) and (b) below:

(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;

(b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

(iv) The provisions to ensure that the CPA implementer is aware of, and has agreed that the activity is being subscribed to the PoA;

The Carbon Protocol of SA, as the CME, will sign a contract with each CPA owner. This contract states the requirements of the PoA as well as the process of joining and the responsibilities of a CPA under this PoA. The signing of the contract indicates awareness and agreement of the CPA implementer thereof. Under the Carbon Protocol, CPA owners are also represented on the management committee of the PoA, to ensure that the PoA is managed in the best interest of the underlying CPAs

A.4.4.2. Monitoring plan:

The monitoring plan will ensure that each CPA's emission reductions are accurately monitored, recorded and reported.

(i) Overall PoA management

The Carbon Protocol of SA is the PoA managing entity and is responsible for the project documentation of the PoA and CPA. The installation of the cogeneration and/or trigeneration systems will typically be managed by the owner(s) of each commercial site (the CPA implementer(s)). The Carbon Protocol of SA has opted to verify each CPA individually.

In accordance with EB 33, Annex 31, no sampling plan is applicable to this PoA.

(ii) Data monitoring and collection during the crediting period

An online database will be developed by the managing entity, 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. 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.

(iii) Data verification

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. This 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 managing entity.

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 implementation of this PoA.

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

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

>>
01/02/2013 or the date of registration whichever is later

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

>>
28 years

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 ✕

The environmental analysis will be done at a CPA level, as each CPA will have different environmental impacts.

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

>>
The programme mainly has a positive impact on the environment. It will reduce the electricity consumption from the South African national grid. The reduction in electricity consumption from the national grid will result in a reduction of coal-based electricity and all the negative impacts associated with coal mining such as: the impact of the actual (coal) mining process, the utilisation of scarce water resources, SO_2 emissions and the impacts associated with the disposal of coal ash. Hence the project will reduce GHG emissions.

Furthermore, the combustion of natural gas (used in the generation of electricity), emits lower levels of NO_x, CO_2, and particulate emissions, than coal. The combustion of natural gas also emits negligible amounts of SO_2 and mercury[7].

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

>>
The environmental impacts of the programme will be considered on a CPA level in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998 [Current regulations 386 & 387 and/or any other regulation that may be applicable at the time]).

[7] NaturalGas.org. (2010). *Natural Gas and the Environment.* Retrieved from http://www.naturalgas.org/environment/naturalgas.asp

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 ☒

The local stakeholders will vary for every CPA included in the PoA. Hence, it is proposed to undertake local stakeholder consultation at a CPA level.

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

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Not applicable. This section has been intentionally left blank.

D.3. Summary of the comments received:

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Not applicable. This section has been intentionally left blank.

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

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Not applicable. This section has been 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 is AMS II.K.: 'Installation of co-generation or tri-generation systems supplying energy to commercial buildings', Version 01. This methodology was developed specifically for this programme.

A combination of the following methodological tools may be used in a CPA (depending on the type of technology that the cogeneration and/or trigeneration facility is either supplementing or replacing):

(i) 'Tool for the assessment and demonstration of additionality' (Version 06.0.0).
(ii) 'Tool to determine the remaining lifetime of equipment' (Version 01).
(iii) 'Tool to calculate the emission factor for an electricity system' (Version 02.2.1).
(iv) 'Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion' (Version 02).
(v) 'Tool to determine the baseline efficiency of thermal or electric energy generation systems' (Version 01).
(vi) 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption' (Version 01).

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.K. *Installation of co-generation or tri-generation systems supplying energy to commercial buildings*, Version 01). This is justified below.

Item	AMS II.K.	CPA
1	*This methodology applies to the installation of fossil fuel based co-generation or tri-generation facilities that simultaneously produce electricity and cooling (e.g., chilled water) and/or heating (e.g., hot water) for supplying such energy to commercial, non-industrial, buildings.*	Each CPA involves the installation of a new natural gas cogeneration or trigeneration system that simultaneously produce electricity and cooling (e.g., chilled water) and/or heating (e.g., hot water) for supplying such energy to commercial, non-industrial, buildings. This item is evaluated by eligibility criterion (e).

2	*The methodology is applicable to installation of new co-generation or tri-generation systems that replace or supplement either: the operation of (a) existing systems that supply electricity (grid or on-site generation) and cooling (e.g., chillers) and/or heating systems (e.g., boilers) or (b) electricity and cooling and/or heating systems that would have been built and utilized.*	Each CPA involves the installation of a new cogeneration or trigeneration system. The system will replace or supplement either: the operation of (a) existing systems that supply and cooling and/or heating systems, or (b) electricity and cooling and/or heating systems that would have been built and utilized. This item is evaluated by eligibility criterion (e).
3	*The methodology does not apply to the replacement of existing co-generation or tri-generation systems.*	Each CPA involves the installation of a new cogeneration or trigeneration system, and not the replacement of an existing cogeneration or trigeneration system. This item is evaluated by eligibility criterion (e).
4	*If it is identified that the baseline situation is the continued use of existing system then the existing system must have been in operation for at least the immediately prior three years, to the start date of the project activity, in order to ensure that adequate baseline performance data are available.*	If it is identified that the baseline situation is the continued use of the existing system then each CPA is implemented at a commercial site with a cooling and/or heating system. The existing system will in this case, have been in operation for at least three years prior to the start date of the programme activity. In the case of a new installation, this criterion is not applicable.
5	*This methodology only applies to commercial, non-industrial applications. Projects that comprise energy efficiency measures implemented through integration of a number of utility provisions (for example, integrating power, heat, and cooling systems) of an industrial facility cannot apply this methodology.*	Each CPA will be implemented at a commercial or non-industrial building. With regard to this PoA, a commercial facility is classified as the premises of a business enterprise excluding industrial facilities. This item is evaluated by eligibility criterion (e).

6	*For the purpose of this methodology, natural gas is defined as a gas which consists primarily of methane and which is generated from (i) natural gas fields (non-associated gas), (ii) associated gas found in oil fields. It may be blended up to 1% on a volume basis with gas from other sources, such as, inter alia, biogas generated in biodigesters, gas from coal mines, gas which is gasified from solid fossil fuels, etc.*	The gas fed to the internal combustion engine(s) in each CPA will qualify as natural gas under the definition as per the methodology..
7	*Any chilled water/cooling, hot water/heat and electricity produced by the co-generation or tri-generation system must be used on-site (within the project boundary) to meet all or part of the energy demand. Existing chillers, boilers, electrical heaters, electricity generating units, etc. may remain in operation after the implementation of the project activity to either (a) supply the balance of the demand not met by the co-generation or tri-generation systems if the cogeneration or tri-generation system has insufficient capacity to supply the total energy demand and/or (b) provide backup to the co-generation or tri-generation facilities. However, emission reductions can only be claimed for the cooling, heat and electricity produced by the new co-generation or tri-generation system.*	The chilled water/cooling; hot water/heat; and electricity produced by the cogeneration and/or trigeneration system will be used on-site to meet all or part of the building's energy demand. Compliance needs to be demonstrated in the detailed project plan or technical project specification, including the description of the existing and project future supply and demand Emission Reductions will only be claimed for cooling, heat and electricity produced by the new co-generation or tri-generation system
8	*The energy savings caused by a single project activity may not exceed the equivalent of 60 GWh per year. A maximum saving of 60 GWh is equivalent to maximum savings of 60 GWh_e of electricity consumption or maximum savings of 180 GWh_{th} of fuel consumption, i.e., for calculation of maximum savings allowable per year, 1 GWh_e equals 3 GWh_{th}.*	Each CPA will result in energy savings of less than 60 GWh or maximum savings of 180 GWhth of fuel consumption, per year for both systems that replace or supplement either: the operation of (a) existing systems that supply electricity (grid or on-site generation) and cooling (e.g. chillers) and/or heating systems (e.g. boilers) or (b) electricity and cooling and/or heating systems that would have been built and utilized. This item is evaluated by eligibility criterion (e) and (j) as well as in the technical project specifications stating the expected maximum energy savings

9	*This project activity can include installation of cooling equipment which use refrigerants only if such refrigerants have no global warming potential (GWP) and no ozone depleting potential (ODP) and if such installation is not mandated by laws or regulations.*	If the CPA makes use of equipment which use refrigerants, these refrigerants will have no global warming potential (GWP) or ozone depleting potential (ODP). This item is evaluated by eligibility criterion (e).
10	*In case the produced electricity, cooling and/or heat are delivered to a facility that is not owned or under the control of the project owner, a contract between the project owner and consumer of the energy must be in force, during the crediting period, specifying that only the facility generating the energy can claim CERs from the emissions displaced by the subject project.*	The electricity, cooling and/or heating in each CPA will be used on-site at each commercial site. In case where the facility is not owned or under the control of the project owner a contract between the project owner and consumer of energy should be in place specifying that only the facility generating the energy can claim CERs from the project.
11	*Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered,* *as per the guidance provided in the leakage section of ACM0009. In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero.*	CPAs in this programme will calculate leakage in accordance to ACM0009 version 04.0.0. Where reliable and accurate data on upstream CO2 emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor. Where such data is not available, project participants may assume a default value of 6 tCO2/TJ as a rough approximation. The calculation for this leakage is provided in E6.2

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

>>
According to methodology AMS II.K. version 01, the project boundary encompasses the physical site of the facility where the cogeneration or trigeneration system is being implemented and the facility (ies) consuming the energy generated by the project activity.

The GHG reduced through the CPAs under this PoA is CO_2. The reduction takes place through the avoidance of fossil fuels (predominantly coal) used in the production of electricity, and the avoiding the installation of electrical equipment for heating equipment and cooling. The gases and sources relevant to the CPA are listed below, based on methodology AMS II.K. version 01.

	Source	Gas	Included?	Justification/Explanation
Baseline	Electricity generation from the grid	CO_2	Included	The main source of emissions in the baseline, as grid electricity is used directly and indirectly (through use of heating and/or cooling equipment) .
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
	Electricity generation – captive source	CO2	Excluded	Excluded from this PoA, to simplify and limit applicability. Anticipated CPAs do not have captive electricity generation in South Africa
	Fossil fuel consumption due to steam generation	CO_2	Excuded	steam generating systems are excluded from this PoA.for simplification. Anticipated CPAs do not use or require steam generation in South Africa
		CH_4	Excluded	Excluded for simplification. This is conservative.
		N_2O	Excluded	Excluded for simplification. This is conservative.
Project Activity	Fossil fuel consumption due to the CPA project activity	CO_2	Included	The main source of emissions in the project activity.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
	Supplemental electricity consumption	CO_2	Included	The main source of emissions in the project activity.
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.
Leakage Emissions	Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered, as per the guidance provided in the leakage section of ACM0009. In case leakage emissions in the	CO_2	Included	The main source of emissions resulting from leakage
		CH_4	Excluded	Excluded for simplification.
		N_2O	Excluded	Excluded for simplification.

	baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero.			
	Leakage from transfer of equipment to or from another project as well as the re-use of the refrigeration gases (if it has a GHG potential)	CO_2	Excluded	This leakage will not occur as the transfer of equipment and the re use of the refrigerant gas is prohibited under this PoA
		CH_4	Excluded	
		N_2O	Excluded	
		Other GHG	Excluded	

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

>>

The CPA implementer needs to choose the appropriate baseline in accordance with the methodology.

The baseline scenario for baseline emission calculations shall depend (a) on the source of electricity and (b) the technology that would have been used to produce heating and/or cooling, in the absence of the project activity. The following baseline options are applicable to this methodology:

- Electricity is imported from the grid and;
- Cooling (e.g., chilled water) is produced in a vapour compression system driven by electricity;
- Heating (e.g., hot water) is produced using electricity.

The assessment of the alternatives to the CPAis shown below.

Step 1: *Identify the various alternatives available to the project proponent that deliver comparable level of service including the proposed project activity undertaken without being registered as a CDM project activity.*

The alternative scenarios available to the project proponent are the following:

1. Proposed project activity not undertaken as a CDM project activity.
2. Greenfield fossil fuel fired power plant to meet the facility's energy, heating and cooling requirement.
3. Greenfield renewable energy based power plant to meet the facility's energy, heating and cooling requirement.
4. Captive energy generation with lower efficiency or lower recovery than the project activity.
5. Electricity is imported from the grid to meet the facility's energy, heating and cooling requirement.

Step 2: *List the alternatives identified per Step 1 in compliance with the local regulations (if any of the identified baseline is not in compliance with the local regulations, then exclude the same from further consideration).*

Step 3: *Eliminate and rank the alternatives identified in Step 2 taking into account barrier tests specified in attachment A to Appendix B[8] of the simplified modalities and procedures of SSC*

[8] Attachment A to Appendix B has since been replaced with version 09.0 of the 'Guidelines on the demonstration of additionality of small-scale project activities'.

*CDM. (*The barriers specified in version 09.0 of the 'Guidelines on the demonstration of additionality of small-scale project activities' are an investment barrier, a technological barrier, a prevailing practice barrier and other barriers.)

Step 4: *If only one alternative remains that is: not the proposed project activity undertaken without being registered as a CDM project activity; and it corresponds to one of the baseline scenarios provided in the methodology; then the project activity is eligible under the methodology. If more than one alternative remains that corresponds to the baseline scenarios provided in the methodology, choose the alternative with the least emissions as the baseline.*

This PoA is applicable if the only realistic and credible alternative that remains after the barrier test is alternative (5). Alternative (5) corresponds to the baseline in paragraph 12 of AMS-II.K.]

Therefore, the baseline for this project activity is electricity is imported from the grid to meet the energy requirement. That is:

a) Electricity is imported from the grid;
b) Cooling is produced in a vapour compression system driven by electricity;
c) Heating is produced by electricity.

Under this PoA two CPA scenarios are allowed, the first being the replacement/supplementing existing systems, and the second being the replacement of systems that would have been built.

The appropriate baseline scenario must, in accordance with the methodology, be selected from one of the following scenarios:

(a) In the first CPA scenario the project replaces/supplements existing systems: The project consists of the installation of a new cogeneration or trigeneration system that replaces or supplements the operation of existing systems that supply grid electricity and cooling (e.g., chillers) and/or heating systems (e.g., boilers). In such cases the baseline scenario is defined as either:

(i) If the total annual consumption of energy (electricity, cooling and heating) by the consuming commercial buildings does not increase by more than 20% from the established baseline values during the crediting period then the baseline scenario is the continuation of the operation of the existing systems and baseline emissions are established from the characteristics of the existing systems using data from the immediately prior three years (to the date of project start up);

(ii) If during the crediting period, total annual consumption of energy (electricity, cooling and heating) by the consuming commercial building does increase by more than 20% from the established baseline values then one of two options are applicable:

- If it can be demonstrated, using the related and relevant procedures prescribed in the SSC general guidance, that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then such systems can be continued to be used for determining baseline emissions;
- If it cannot be demonstrated that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then the Baseline Reference Plant Approach, as defined below shall be used.

(iv) If, irrespective of total annual energy consumption of baseline or project scenarios, it is determined that new and more efficient systems (as compared to the existing systems) would have been installed in the absence of the project activity (for example, due to the baseline equipment reaching the end of its useful life at any point during the crediting period) then the Baseline Reference Plant Approach, as defined below, shall be used.

(b) In the second CPA scenario the project replaces systems that would have been built: The project consists of the installation of a new cogeneration or trigeneration system that replaces the operation of electricity and cooling and/or heating systems that would have been built and utilized. In such cases the Baseline Reference Plant Approach, shall be used to define the baseline scenario.

In cases where the baseline scenario consists of the installation of new cooling and/or heating systems and/or the utilization of new electricity sources, a Reference Plant shall be defined as the baseline scenario. The Reference Plant shall be based on common practice for similar capacity, new heating and cooling systems and sources of electricity in the same commercial sector and in the same country or region as the project. The identification of the Reference Plant should exclude plants implemented as CDM project activities. In cases where no such plant exists within the region, the economically most attractive technology and fuel type should be identified among those which provide the same service (i.e., the same or similar power, heat and/or cooling capacity), that are technologically available, and that are in compliance with relevant regulations.

The efficiency of the technology should be selected in a conservative manner, i.e., where several technologies could be used and are similarly economically attractive, the most efficient technology should be defined as the baseline scenario. In addition, the least carbon intensive fuel type should be chosen in case of multiple fuels being possible choices.

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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If the CPA is a microscale project[9], then the CPA implementer(s) shall demonstrate additionality by following the guidance provided in EB 60, Annex 25 'Guidelines for demonstrating additionality of microscale project activities'.

If the CPA is not a microscale project, the CPA implementer(s) can demonstrate the additionality using either Approach 1 or Approach 2 given in the Section E.5.2 below.

Additionality of the small scale CDM project can be demonstrated by showing that the project would not have occurred anyway due to an investment analysis as Approach 1 or existence of the barrier as per Approach 2.

A description of the barrier at PoA level is provided in section A.4.3. The arguments presented therein are also prevalent in the CPA project area. Hence, the CPA need not re-write the arguments presented

[9] Where each of the independent subsystems/measures in the CPA achieves an estimated energy saving equal to or smaller than 600 MWh, as per EB 60 Annex 25.

therein to support CPA additionality, except present an analysis to support the key barrier to the project CPA operator.

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

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In accordance to EB 68, Annex 26, paragraph 3: Energy efficiency project activities that aim to achieve energy savings at a scale of no more than 20 gigawatt hours per year are additional if any one of the conditions below is satisfied:

(a) The geographic location of the project activity is in an LDC/SIDS or special underdeveloped zone of the host country identified by the government

(b) The project activity is an energy efficiency activity with both conditions (i) and (ii) below satisfied:

(i) Each of the independent subsystems/measures in the project activity achieves an estimated annual energy savings equal to or smaller than 600 megawatt hours;
(ii) End users of the subsystems or measures are households/communities/SMEs.

If the CPA is not a microscale project, the additionality of the SSC-CPA is demonstrated in accordance to "Guidelines on the demonstration of additionality of small-scale project activities" EB 68, Annex 27.

Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to the existence of at least one of the following barriers:

- Investment barrier
- Technological barrier
- Barrier due to prevailing practice
- Other barriers

The CPA implementer is to provide evidence to prove the existence of the barrier as well as an explanation as to how the CDM alleviated the existence of the barrier.

In the case of proving the **investment barrier**, the CPA implementer may use the framework financial calculation sheet provided, both an IRR calculation against the default benchmark would be acceptable.

In the case of proving the **technology barrier**, the CPA implementer may confirm this through an independent report including but not limited to:

- performance uncertainty or
- low market share of the new technology adopted for the project activity, or
- the demonstration of non availability of human capacity to operate and maintain the technology, or
- lack of infrastructure to utilize the technology, or unavailability of the technology, or
- high level of technology risk.

In case of the proving the **prevailing practice barrier**, the demonstration should include, but not be limited to, that the proposed project is among the first of its kind in terms of technology, geography, sector, type of investment and investor or market

In case of demonstrating other barriers the demonstration should include information about institutional barriers or limited information, managerial resources, organizational capacity, or capacity to absorb new technologies.

Thus in accordance with the above, at the time of SSC-CPA inclusion, the additionality of the SSC-CPA shall be evaluated and if it meets the eligibility criteria of the PoA, the SSC-CPA shall be deemed additional. Additionality will be therefore be demonstrated at the CPA level in the CPA-DD and checked by the CME prior to inclusion.

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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AMS II.K. is selected for a typical CPA. *This methodology applies to the installation of fossil fuel based co-generation or tri-generation facilities that simultaneously produce chilled water and/or heating for supplying such energy to commercial, non-industrial buildings*.

Each CPA would constitute a new cogeneration and/or trigeneration system that replaces or supplements the operation of existing systems that supply electricity (grid or on-site generation) and cooling (e.g. chillers) and/or heating systems (e.g. boilers).

The PoA restricts the existing system to electricity from the grid, which is common practice in South Africa and excludes on site captive power plants.
The combination of the CPAs anticipated to join and the common practice in commercial facilities considering the cogeneration/trigeneration system it is unlikely that equipment will be transferred or gas re-used. Therefore this PoA does not allow, or include the calculations, for

- leakage from the transfer of displaced energy generating equipment from or existing equipment transferred to another activity
- Leakage from the storage or usage in another equipment – therefore the displaced refrigerant must be destroyed if it is a greenhouse gas as defined in Annex A of the Kyoto Protocol or in paragraph 1 of the Convention

In addition the PoA is restricted to the use of hot water and excludes the use of steam. Hot water consumption in commercial facilities is common while the use of steam is limited. The anticipated facilities participating under this PoA do not have a steam demand and therefore it is excluded from this PoA. Hot water demand in the baseline is restricted to the use of electricity as energy source.

Emission reductions are determined by methodology AMS II.K (Version 01). The equations used for calculating the emission reductions are found in section E.6.2.

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 a CPA are calculated in accordance with methodology AMS II.K '*Installation of co-generation or tri-generation systems supplying energy to commercial buildings'* (version 01).

1. Baseline emissions

The baseline emissions (BE_y) are calculated using equation (1) of the applied methodology:

$$BE_y = BE_{grid,y} + BE_{capt,y} + BE_{BC,y} + BE_{BH,y} \quad \text{(AMS II.K. equation 1)}$$

Where:

BE_y	Baseline emissions in year *y* (tCO_2e/year)
$BE_{grid,y}$	Baseline emissions associated with grid electricity displaced by the project in year *y* (tCO_2e/year)
$BE_{capt,y}$	Baseline emissions associated with the electricity produced by a captive power plant in year *y* (tCO_2e/year). For this PoA, it is assumed that $BE_{capt,y} = 0$.
$BE_{BC,y}$	Baseline emissions associated with the cooling (e.g., chilled water) produced in year *y* (tCO_2e/year)
$BE_{BH,y}$	Baseline emissions associated with the heat (e.g., hot water) produced in year *y* (tCO_2e/year)

Baseline electricity related emissions

If the CPA displaces electricity that was previously obtained from the grid or would have been obtained from the grid, the baseline emissions include the CO_2 emissions of the power plants connected to the grid. The baseline emissions ($BE_{grid,y}$) are calculated based on the amount of grid electricity displaced by the project activity times the emission factor of the grid calculated, as indicated in equation (2), in accordance with methodology AMS-II.K.

$$BE_{grid,y} = E_{grid,y} \times EF_{grid,y} \quad \text{(AMS II.K. equation 2)}$$

Where:

$BE_{grid,y}$	Baseline emissions for the grid electricity displaced by the project in year *y* (tCO_2e/year)
$E_{grid,y}$	Amount of grid electricity displaced by the project in year *y* (MWh)
$EF_{grid,y}$	Emission factor of the grid (calculated in accordance to the *Tool to calculate the emission factor for an electricity system* (Version 02.2.1) (tCO_2e/ MWh)

In the case of trigeneration, baseline emissions associated with the electricity consumed to produce chilled water within the project boundary are calculated using equation (5) of the applied methodology:

$$BE_{BC,y} = EF_{ELEC,y} \times \sum_i \frac{C_{P,i,y}}{COP_{c,i}} \quad \text{(AMS II.K. equation 5)}$$

Where:

$BE_{BC,y}$	Baseline emissions for chilled water produced in the project activity in year *y* (tCO_2e/year)
$EF_{ELEC,y}$	Electricity emission factor of the grid
$COP_{c,i}$	The Coefficient of Performance of the baseline scenario chiller(s) *i* (MWh_{th}/MW_{he}), as determined by point 20 (a) of methodology AMS II.K., version 01
$C_{P,i,y}$	Cooling output of baseline scenario chiller(s) *i* in year *y* (MWh_{th}/year), as determined by equation (6) of AMS II.K., version 01

The cooling output of the baseline scenario chillers is calculated using measured values of the total chilled water mass flow rate and of the differential temperature of incoming and outgoing chilled water, as per equation (6) of the applied methodology:

$$C_{P,i,j} = \frac{\sum_{h=1}^{8,760} m_{C,h} \times C_{pw,C} \times \Delta T_{C,h}}{3600} \quad \text{(AMS II.K. equation 6)}$$

Where:

$C_{P,j}$	Cooling output of the baseline chillers in year *y* ($MWht_h$/year)
$m_{C,h}$	The chilled water mass flow rate for chillers produced by project in hour *h* of year *y* (tonnes/hour)
$C_{pw,C}$	The specific heat capacity of water (MJ/tonnes°C) (4.2 MJ/t°C)
$\Delta T_{C,h}$	Differential temperature of inlet and outlet chilled water for chillers in hour *h* of year *y* of incoming and outgoing water from project (°C)

Baseline emissions associated with the production of heat

For CPAs with water heating systems that use electricity, the baseline emissions are determined using the electricity emission factor and hourly measurements of the total water mass flow-rate and differential temperature of incoming and outgoing water, per equation (7) of the applied methodology. This equation is based on the assumption that the efficiency of electric water heating systems is 100%.

$$BE_{BH,y} = EF_{ELEC,y} \times \sum_{h=1}^{8.760} \frac{m_h \times C_{pw} \times \Delta T_h}{3600} \quad \text{(AMS II.K. equation 7)}$$

Where:

$BE_{BH,y}$	Baseline emissions for hot water produced in the project activity in year *y* (tCO_2e/year)
$EF_{ELEC,y}$	Electricity emission factor of the grid
m_h	The water mass flow rate from heater(s) during hour *h* in year *y* (tonnes/hour)
C_{pw}	The specific heat capacity of water (MJ/tonnes °C) (4.2 MJ/t °C)
ΔT_h	Differential temperature of inlet and outlet hot water for heater(s) during hour *h* (°C)

2. Project emissions

Project emissions in each CPA are equal to the emissions associated with consumption of fossil fuel and electricity within the project boundary by the co-generation or tri-generation system, auxiliary equipment, and systems (such as boilers, chillers and hot water heaters, used to generate any backup or supplemental electricity, heating or cooling.

The project emissions are calculated as per the applied methodology:

$$PE_y = PE_{FC,j,y} + PE_{EC,y}$$

Where:

PE_y	Emissions in year *y* (tCO_2e/year) in project activity
$PE_{FC,j,y}$	Emissions from the consumption of fossil fuels in the project activity in year *y* (tCO_2e/year)
$PE_{EC,y}$	Emissions from the consumption of electricity in the project activity in year *y* (tCO_2e/year)

Fossil Fuel Consumption:

The only fossil fuel used in the PoA is natural gas. The emissions associated with the consumption of natural gas are calculated in accordance with the 'Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion', Version 02, EB 41, Annex 11.

The project emissions from the consumption of natural gas are calculated with equation 1 from the Tool; where the emissions are based on the quantity of fuel combusted and the CO_2 emission coefficient of the fuel; as follows:

$$PE_{FC,y} = FC_y \times COEF_{NG,y}$$ (Fossil fuel tool equation 1)

Where:

$PE_{FC,y}$ Project emissions from the consumption of fossil fuels in year *y* (tCO_2e/yr)
$FC_{j,y}$ Quantity of fuel consumed by the project activity in year *y* (m^3/yr)
$COEF_{NG,y}$ CO_2 emission coefficient of natural gas in year *y* (tCO_2e/ m^3)

The applied tool states that the CO_2 emission coefficient ($COEF_{i,y}$) can be calculated using one of two options, depending on the availability of data of natural gas. Although Option A is the preferred approach, South Africa does not generally measure the weighted average mass fraction of carbon in the natural gas ($w_{c,j,y}$), nor is this information supplied by Gas supply companies on its fuel supply invoices. Therefore, Option A cannot be used.

The CO_2 emission coefficient of natural gas will, therefore, be calculated using Option B from the Tool, where the coefficient, $COEF_{i,y}$, is based on net calorific value and the CO_2 emission factor of natural gas; as follows:

$$COEF_{NG,y} = NCV_{NG,y} \times EF_{CO_2,NG,y}$$ (Fossil fuel tool option B)

Where:
$COEF_{i,y}$ CO_2 emission coefficient of natural gas in year *y* (tCO_2e/m^3)
$NCV_{NG,y}$ Net calorific value of natural gas in year *y* (MJ/m^3)
$EF_{CO_2,NG,y}$ Emission factor of natural gas in year *y* (tCO_2e/MJ)

Electricity Consumption:

The electricity consumption of the project, including any electricity used to run auxiliary equipment, is calculated using the 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption', Version 01, EB 39, Annex 7. Scenario A of the Tool applies because electricity is purchased from the grid only in the CPA.

A generic approach is taken. The project emissions from the consumption of electricity by trigeneration plant is calculated based on the quantity of electricity consumed and an emission factor for electricity generation (taking into account transmission losses). This is calculated using equation (1).

$$PE_{EC,y} = EC_{PJ,y} \times EF_{EL,y} \times (1 + TDL_y)$$ (equation (1) of the tool)

Where:
$EC_{PJ,y}$ Energy consumption in year y (MWh/year)

$EF_{EL,y}$ Emission Factor of the grid in year y (tCO_2e/MWh)
TDL_y Transmission and distribution losses in year y

Leakage

According to paragraph 24 of AMS-II.K, '*Leakage is to be considered if the displaced energy generating equipment is transferred from another activity or the existing equipment is transferred to another activity*'.

According to paragraph 25 of AMS-II.K, '*If the displaced refrigerant is a greenhouse gas as defined in Annex A of the Kyoto Protocol or in paragraph 1 of the Convention and is not destroyed, leakage emission from its storage or usage in another equipment must be considered and deducted from the emission reductions*'.

As the transfer of displaced energy generating equipment is not included in the PoA and the displaced refrigerant, if a greenhouse gas, must be destroyed; this leakage is zero.

According to paragraph 27 of AM-II.K, '*Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered, as per the guidance provided in the leakage section of ACM0009. In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero*'.

Since LNG may be used in a CPA, the leakage from the consumption of LNG is determined as follows:

$$LE_{LNG,CO2,y} = FF_{project,y} \cdot EF_{CO2,upstream,LNG}$$

Where:
$LE_{LNG,CO2,y}$ = Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year *y* in tCO_2e
$FF_{project,y}$ = Quantity of natural gas combusted in all element processes during the year *y* in m^3 or TJ
$EF_{CO2,upstream,LNG}$ = Emission factor for upstream CO_2 emissions due to fossil fuel combustion/ electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system (tCO2e/m3) or (tCO2e/TJ)

Where reliable and accurate data on upstream CO2 emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor. Where such data is not available, project participants may assume a default value of 6 tCO2/TJ as a rough approximation.

$$LE_y = LE_{LNG,CO2y}$$

3. Emission reductions

The emission reductions in each CPA are calculated as the difference between the baseline emissions and the project and leakage emissions, as represented below:

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y	Emission reductions in year *y* (tCO_2e/year)
BE_y	Baseline emissions in year *y* (tCO_2e/year)
PE_y	Project emissions in year *y* (tCO_2e/year)
LE_y	Leakage emissions in year *y* (tCO_2e/year)

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

Data / Parameter:	$EF_{grid,CM}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO2 emission factor for the project electricity system in the year *y*
Source of data used:	Calculated in accordance with version 02.2.1 of the 'Tool to calculate the emission factor for an electricity system'.
Value applied:	To be calculated at CPA level
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the applied tool, this parameter can be fixed ex-ante.
Any comment:	For each CPA this is fixed ex ante

Data / Parameter:	$COP_{c,i}$
Data unit:	MWh_{th}/MWh_e (MWh thermal output/MWh electrical input)
Description:	The Coefficient of Performance (COP) of the baseline scenario chiller(s) *i*.
Source of data used:	Manufacturer specifications.
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 :	Depending on the scenario either the COP of existing equipment or what would have been installed will be used or obtaining information from two manufacturers in accordance with the baseline calculations The COP is then determined as the highest COP full load performance value provided by two manufacturers
Any comment:	For each CPA this is fixed ex ante

Data / Parameter:	$EF_{CO2,upstream,LNG}$
Data unit:	tCO_2e/TJ or tCO_2e/m^3
Description:	Emission factor for upstream CO_2 emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system
Source of data used:	Either from gas suppliers data, publically available data or a default factor
Value applied:	To be completed by the CPA implementer(s) alternatively a default value of 6 tCO2/TJ
Justification of the choice of data or	Default value can be used if no reliable and accurate data on upstream CO2 emissions due to fossil fuel combustion/electricity consumption associated with

description of measurement methods and procedures actually applied :	the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available.
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:	$E_{grid,y}$
Data unit:	MWh/year
Description:	Amount of grid electricity displaced by the project in year *y*.
Source of data to be used:	The amount of grid electricity displaced will be monitored using a calibrated energy meter.
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 amount of grid electricity displaced will be continuously monitored and measured hourly. This data will be aggregated monthly for the purpose of calculating emission reductions.
QA/QC procedures to be applied:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.
Any comment:	

Data / Parameter:	$m_{C,i,h}$
Data unit:	tonnes/hour
Description:	The chilled water mass flow rate for chiller(s) i produced by the project in hour *h* of year *y*.
Source of data to be used:	Calibrated flow meter.
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:	An electromagnetic flow measuring system will be used to measure the chilled water mass flow rate. The electromagnetic measuring principle is explained by relating the flowing medium to a moving conductor. The maximum measured error of this system is ±0.5%. The readings from these meters will be logged every hour and aggregated monthly for use in the emission reduction report. No emission reductions will be claimed for periods when the meter fails.
QA/QC procedures to be applied:	The cooling output of the absorption chillers will also be measured using thermal energy meters. The readings from the thermal energy meters will be logged every hour into the plant control system. The cooling output that is measured can be used as a crosscheck against the cooling output that is calculated from the chilled water mass flow rate and the differential temperature of inlet and outlet chilled water. In accordance with paragraph 17(c) of version 17 of the 'General guidelines to SSC CDM methodologies', the flow measuring system will be calibrated according to South African national standards and recalibrated at appropriate

	intervals according to the system manufacturer specifications, but at least once in three years.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	$\Delta T_{C,i,h}$
Data unit:	°C
Description:	Differential temperature of inlet and outlet chilled water for chiller(s) *i* in hour *h* of year *y* of incoming and outgoing water from project
Source of data to be used:	Calibrated meter.
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:	Each chiller has a chilled water supply and return temperature sensor, which will be used to measure the incoming and outgoing chiller water continuously. The differential temperature will be calculated in the onsite Building Management System (BMS).The readings from this sensor will be logged every hour and aggregated monthly for use in the emission reduction report. No emission reductions will be claimed for periods when the sensors fail.
QA/QC procedures to be applied:	The cooling output of the absorption chillers will also be measured using thermal energy meters. The readings from the meters will be logged every hour in to the plant control system. The cooling output that is measured can be used as a crosscheck against the cooling output that is calculated from the chilled water mass flow rate and the differential temperature of inlet and outlet chilled water. In accordance with paragraph 17(c) of version 17 of the 'General guidelines to SSC CDM methodologies', the temperature sensors will be calibrated according to South African national standards and recalibrated at appropriate intervals according to the sensor manufacturer specifications, but at least once in three years.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	m_h
Data unit:	tonnes/hour
Description:	The water mass flow rate from heater(s) during hour *h* in year *y*.
Source of data to be used:	Calibrated flow meter.
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	An electromagnetic flow measuring system will be used to measure the hot water mass flow rate. The electromagnetic measuring principle is explained by relating

and procedures to be applied:	the flowing medium to a moving conductor. The maximum measured error of this system is ±0.5%. The readings from this meter will be logged every hour and aggregated monthly for use in the emission reduction report. No emission reductions will be claimed for periods when the meter fails.
QA/QC procedures to be applied:	The heating output of the heat exchanger will also be measured using a thermal energy meter. The readings from the meter will be logged every hour in to the plant control system. The heating output that is measured can be used as a crosscheck against the heating output that is calculated from the hot water mass flow rate and the differential temperature of inlet and outlet hot water. In accordance with paragraph 17(c) of version 17 of the 'General guidelines to SSC CDM methodologies', the flow measuring system will be calibrated according to South African national standards and recalibrated at appropriate intervals according to the system manufacturer specifications, but at least once in three years.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	ΔT_h
Data unit:	°C
Description:	Differential temperature of inlet and outlet hot water from heater(s) during hour *h*
Source of data to be used:	Calibrated meter.
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 heat exchanger has a hot water supply and return temperature sensor, which will be used to measure the incoming and outgoing water continuously. The differential temperature will be calculated and logged every hour and aggregated monthly for use in the emission reduction report. No emission reductions will be claimed for periods when the sensors fail.
QA/QC procedures to be applied:	The heating output of the heat exchanger can also be measured using a thermal energy meter. The readings from the meter should also be logged The heating output that is measured can be used as a crosscheck against the heating output that is calculated from the hot water mass flow rate and the differential temperature of inlet and outlet hot water. Where there is a difference of more than 5% it will be noted and explained in the monitoring report, and the most appropriate value be used for the calculations In accordance with paragraph 17(c) of version 17 of the 'General guidelines to SSC CDM methodologies', the temperature sensors will be calibrated according to South African national standards and recalibrated at appropriate intervals according to the sensor manufacturer specifications, but at least once in three years.

Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	$FC_{j,y}$ and $FF_{project,y}$ (for leakage calculation purposes)
Data unit:	m^3/yr
Description:	Quantity of fuel j consumed by the project activity in year *y*
Source of data to be used:	Measured at project site
Value of data	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	The quantity of fuel consumed by the project activity will be monitored continuously using thermal mass flow meters. The readings from these meters will be aggregated monthly for use in the emission reduction report.
QA/QC procedures to be applied:	The plant data will also be cross checked with gas invoices received from the gas supplier for the project. If there is a difference of more than 5% it will be noted and explained in the monitoring report, and the most appropriate value used for the calculations. In accordance with paragraph 17(c) of version 17 of the 'General guidelines to SSC CDM methodologies', the flow meter will be calibrated according to South African national standards and recalibrated at appropriate intervals according to meter manufacturer specifications, but at least once in three years.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	$NCV_{NG,y}$
Data unit:	MJ/m^3
Description:	Net calorific value of natural gas in year *y*
Source of data to be used:	Value provided by gas supplier in monthly gas invoices.
Value of data	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	The energy content of the natural gas used in the project activity, as specified by fuel supplier. The net calorific value from the fuel supply invoices will be aggregated annually for use in the emission reduction report
QA/QC procedures to be applied:	Confirm that the value provided is the net calorific value, if gross calorific value is cited in the invoice then the gas supplier has to provide an annual conversion factor.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later. The data will be maintained in both soft copy and hard copy format

Data / Parameter:	$EF_{CO_2,NG,y}$
Data unit:	tCO_2e/GJ
Description:	Emission factor of natural gas in year *y*
Source of data to be used:	IPCC default value at the upper limit of uncertainty at a 95% confidence interval.
Value of data	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be	The IPCC default value for the emission factor of natural gas, according to the latest IPCC guidelines.

applied:	
QA/QC procedures to be applied:	Any future revisions of the IPCC guidelines will be taken into account.
Any comment:	The applied tool states that if the weighted average CO2 emission factor of natural gas is not provided by the fuel supplier in the invoices, the project participant may select the IPCC default value. Since the fuel supplier does not currently indicate the weighted CO2 emission factor of the natural gas for existing customers, the IPCC emission factor has been used for this project activity. This is a monitored parameter according to version 02 of the 'Tool to calculate project or leakage CO2 emissions from fossil fuel combustion'. See page 7 of the tool.

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh/yr
Description:	Quantity of electricity consumed by the project (electricity consumption source *j)* in year *y*
Source of data to be used:	Measured at project site
Value of data	To be completed by the CPA implementer(s).
Description of measurement methods and procedures to be applied:	The quantity of electricity consumed by the project electricity consumption source will be monitored continuously using power meters. The readings from these meters will be aggregated monthly for use in the emission reduction report.
QA/QC procedures to be applied:	The quantity of electricity used by the trigeneration plant will be monitored continuously using energy meters with a 0.2S accuracy class. The readings from this meter will be logged every hour and aggregated monthly for use in the emission reduction report. No emission reductions will be claimed for periods when the meter fails.
Any comment:	The data will be kept for a minimum of two years after the end of crediting period or the last issuance of CERs, whichever occurs later.

Data / Parameter:	$TDL_{j,y}$
Data unit:	-
Description:	Average technical transmission and distribution losses for providing electricity to source *j* in year *y*
Source of data used:	Annual report of the electricity provider
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	Use data from the Eskom annual report or any other official government database
Any comment:	Used in the calculation of project emissions

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

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The monitoring plan will ensure that the project emission reductions are accurately monitored, recorded and reported.

The following parameters will be monitored onsite during the crediting period:

1. The amount of grid electricity displaced by the project will be monitored using energy meters.
2. The quantity of natural gas consumed by the project activity will be monitored by thermal mass flow meters, which measures the gas flow rate of the main supply line.
3. The quantity of additional electricity consumed by the project activity will be monitored using power meters.

(i) If the total annual consumption of energy (electricity, cooling and heating) by the consuming commercial buildings does not increase by more than 20% from the established baseline values during the crediting period then the baseline scenario is the continuation of the operation of the existing systems and baseline emissions are established from the characteristics of the existing systems using data from the immediately prior three years (to
the date of project start up);

(ii) If during the crediting period, total annual consumption of energy (electricity, cooling and heating) by the consuming commercial building does increase by more than 20% from the established baseline values then one of two options are applicable:

• If it can be demonstrated, using the related and relevant procedures prescribed in the SSC general guidance, that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then such systems can be continued to be used for determining baseline emissions;

• If it cannot be demonstrated that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing systems then the Baseline Reference Plant Approach, as defined below shall be used.

(iii) If, irrespective of total annual energy consumption of baseline or project scenarios, it is determined that new and more efficient systems (as compared to the existing systems) would have been installed in the absence of the project activity (for example, due to the baseline equipment reaching the end of its useful life at any point during the crediting period) then the Baseline Reference Plant Approach, as defined in ASM-II.K. version 1 will be used.

The CPA implementer(s) shall also monitor a combination of the following parameters depending on the type of technology being implemented, as well as the type of technology being replaced:

1. The chilled water mass flow rate (for the chillers, in the case of trigeneration) will be monitored using thermal energy meters.
2. The temperatures of inlet and outlet chilled water (for the chillers, in the case of trigeneration) will be monitored using immersion temperature sensors.
3. The water mass flow rate from the heat exchanger will be monitored using thermal energy meters.
4. The temperatures of the inlet and outlet hot water (for the heat exchanger) will be monitored using immersion temperature sensors.

The process of data collection and storage as described in the CME manual is as follows:

1.

Institution	Responsibility
Carbon Protocol of SA	a) All data will be backed up by the Carbon Protocol of SA.
MTN South Africa	a) All data collected will be archived electronically. Data will be consolidated and submitted to the CME database on a monthly basis[10]. b) All data will be kept for at least two years after the end of the crediting period[11].
Promethium Carbon (The carbon advisor)	a) Data will be received from the CPA on a monthly basis[12]. b) All data collected will be archived electronically[13]. c) All data will be kept by for at least two years after the end of the crediting period[14].

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: 08/07/2011

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

This entity is not a project participant

[10] CPA-DD Section D.7.2

[11] CPA-DD Section D.7.2

[12] CPA-DD Section D.7.2

[13] CPA-DD Section D.7.2

[14] CPA-DD Section D.7.2

Annex 1

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

Organization:	Carbon Protocol of SA
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

Annex 4

MONITORING INFORMATION

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