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):

>>Standard Bank Energy Efficient Commercial Lighting Programme of Activities[1]

Version number: 03
Date: 28/12/2012

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

>> The following information shall be included here:

1. **General operating and implementing framework of PoA**

The Programme of Activities (PoA) will consist of a series of projects (SSC-CPAs) implemented in collaboration with commercial and public building owners and occupiers across South Africa, Botswana and Kenya (hereafter referred as "the countries"). Standard Bank Plc will act as the Coordinating/Managing Entity (CME) for the PoA, and will provide an open platform for different lighting technology suppliers and service providers to participate in the PoA by developing their own SSC-CPAs. The CME will work with participating organisations to design and implement a technology and financing solution to allow for the low-cost uptake of energy efficient lamps and luminaires for commercial and public building lighting applications.

Because of the higher price of more efficient lamps, consumer uncertainty regarding the durability and functionality of new technology, as well as the low level of understanding of the benefits of energy efficiency, building owners and occupiers consistently opt to install cheaper but more inefficient lighting technologies.

The PoA helps to overcome these information and perception barriers, which impede investment in energy efficient lighting equipment by providing a consolidated source of information, technology, services, and carbon finance.

2. **Policy/measure or stated goal of the PoA**

The PoA has the objective of scaling up the installation of energy efficient lighting technologies and systems in non-residential, commercial and public buildings across the countries. This programme will provide technology and financing solutions to businesses to encourage the uptake of energy efficient lighting equipment to replace current cheaper and comparatively inefficient baseline technology.

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

The PoA is a voluntary action initiated by the CME. All building owners and occupiers participating in SSC-CPAs under the PoA will do so through a voluntary collaboration with the CME.

[1] Note the title of the PoA has been updated from the version that was uploaded for GSC to remove reference to specific countries. The original title referred to South Africa, Botswana and Rwanda, whereas the PoA will now initially be implemented in South Africa, Botswana and Kenya. Over time the PoA will expand to further countries, and as such the title has been simplified in order to accommodate a range of countries.

Contribution of the PoA to Sustainable Development

The PoA makes a significant contribution to Sustainable Development in the countries. The section below sets out the key program deliverables across economic, social and environmental parameters across all countries and then outlines specific contributions on an individual country basis.

Contribution to economic development

The PoA will contribute significantly to the economic development of the participating countries through encouraging the more efficient use of electricity by large commercial energy consumers. Energy savings at both individual building and national levels make important contributions to the countries' economic efficiency and sustainability, particularly in the context of the rising demand for electricity currently occurring in the countries. In addition to contributing to national energy efficiency targets and policies, the PoA also provides significant benefits to commercial electricity consumers and the broader energy efficiency industry in the participating countries.

Firstly, the PoA will reduce the overall cost associated with lighting use electricity consumption for commercial and public building owners and occupiers. For businesses and other participants in the PoA, this will have a significant positive impact on the cost effectiveness of their operations and building occupancy. Such cost savings have the potential to have a materially positive impact on the operating expenditures and competitiveness of participating organisations.

Secondly, the PoA will have a positive impact on the energy efficiency 'industry' in the countries. There are currently considerable efforts particularly by Eskom and the South African Government to scale up the activities of energy efficiency providers (ESCOs, technology developers, installers, plumbers, electricians etc). The PoA provides a platform for technology providers and local project developers to generate carbon revenues and access financing from a major African financial institution in order to drive the uptake of energy efficiency in the commercial building sector.

Finally, the PoA will make a contribution to the national energy efficiency objectives of the participating countries, thereby assisting with improving energy security across their economies. For example, South Africa's National Energy Efficiency Strategy sets a target for energy demand reduction in commercial and public buildings of 15% by 2015[2], and includes lighting as an important technology for achieving such targets. In Botswana in 2010, the country generated only 13% of electricity and imported 87% from its neighbouring countries[3]. Such heavy dependence on electricity imports is the key reason for the country's high electricity prices which in turn impede economic development. Like Botswana, Kenya has increased the import of electricity from Ethiopia in the recent years[4] to address the country's energy crisis.

The PoA will aid all these countries in achieving their goals by implementing energy efficient lighting technologies in the commercial buildings.

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[2] See page 15 of the Energy Efficiency Strategy of the Republic of South Africa, Department of Minerals & Energy, March 2005.

[3] See page 12 of the Botswana Power Company Annual Report 2010: http://www.bpc.bw/doc/bpc_annual_report_2010.pdf

[4] Source: REEEP Database, Kenya (2010) - http://www.reeep.org/index.php?id=9353&text=policy&special=viewitem&cid=54

Contribution to social development

This section outlines the contribution that the program will make to the social development for all of the participating countries. In addition, where there are further benefits specific to the individual countries participating these will be described in the CPA-DDs for project activities occurring in those countries.

The PoA has two key contributions to social development: 1) industry development and job creation, and 2) technology transfer.

1. Industry Development and Job Creation

The PoA has the ability to create jobs in three stages of the project; assembly of luminaires, lighting installation, maintenance services, and monitoring services.

Jobs created for the assembly of luminaires from this PoA are likely to be restricted to South Africa so it is covered in that section. Job creation from the installation and maintenance services and monitoring services are covered below.

Lighting installation and maintenance services

Upgrading lighting installations is a labour intensive exercise. A number of jobs would be created in transport and distribution, engineering management and lighting design services, although the primary job creation impact would be in the removal of old equipment and the installation and maintenance of new lighting equipment. The CME estimates that one contractor team, comprising one electrician and two assistants, will take approximately 2 days to retrofit an office environment containing 15-20 luminaires. If a roll out of energy efficient luminaires took place over 3 years, this would create demand for 225 additional jobs. One third of this workforce would be skilled (electrician) while two thirds would be semi-skilled (electrical assistants). *Note these figures are estimates only and will depend on the scale of activity that the PoA is able to generate and the participants in each SSC-CPA.*

The CME is pleased that the majority of jobs created will be at a level where currently unskilled or low skilled labour can be easily incorporated. During the course of this program workers will be equipped with valuable electrical artisanal skills which they can continue to apply after the PoA-related work ends, for instance as solo operators or within small businesses providing basic electrical services to their communities[5].

Monitoring services

Inherent in the PoA is the need to monitor a representative sample of the lights on an ongoing basis. This will provide employment opportunities in management roles (e.g. database management, statistics) and also on the ground roles (e.g. data collection, maintenance).

2. Technology Transfer

The PoA has positive implications for the transfer of technology to the participating countries. The PoA will encourage development of a lighting service business models that are new to these countries. This allows for the linking of the installation of cutting edge energy efficient products to a range of value added services, including installation, maintenance and convenient financing terms.

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[5] The PoA can also create synergies with programs such as South Africa's National Youth Skills Development Programme (NYSDP) which is seeking to create 1000 job opportunities for young people in the energy efficiency sector. See: http://www.thenewage.co.za/21728-1007-53-Designer_project_for_youth_with_energy_ambitions

In addition to the transfer and development of new business models, the PoA will also facilitate the transfer of leading energy efficiency lighting technology into the participating countries. By removing key barriers, the PoA will increase demand for, and provide access to leading clean technologies and products.

Contribution to Environmental Sustainability
The introduction of energy efficient lighting technology in commercial buildings will reduce the consumption, and hence generation of electricity. In addition to reducing GHGs, the PoA will also reduce the harmful gases and particulate matter produced during the burning of fossil fuels to produce electricity. The fossil fuel intensive nature of electricity generation in the participating countries results in the emission of significant amounts of NOx, SO_2, Mercury and particulates. These harmful gases result in environmental impacts such as acid rain and significant human health impacts such as respiratory disease[6]. By reducing the generation of electricity, the PoA will contribute towards a reduction in non-GHG emissions leading to improvements in environmental quality in the participating countries.

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

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

Standard Bank Plc

2. Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.

Name of Party involved (*) ((host) indicates a host Party)	**Private and/or public entity(ies) project participants (*) (as applicable)**	**Kindly indicate if the Party involved wishes to be considered as a project participant (Yes/No)**
Republic of South Africa	Standard Bank Plc	No
Republic of Kenya	Standard Bank Plc	No
Republic of Botswana	Standard Bank Plc	No
United Kingdom of Great Britain and Northern Ireland	Standard Bank Plc	No

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

A.4.1. Location of the programme of activities:

>>Republic of South Africa, Republic of Botswana, Republic of Kenya

A.4.1.1. Host Party(ies):

[6] See for example: Physicians for Social Responsibility, "Coal's Assault on Human Health" http://www.psr.org/resources/coals-assault-on-human-health.html

>>Republic of South Africa, Republic of Botswana, Republic of Kenya

A.4.1.2. Physical/ Geographical boundary:

>> Definition of the boundary for the PoA in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA will be implemented, taking into consideration the requirement that all applicable national and/or sectoral policies and regulations of each host country within that chosen boundary;

The boundary of the PoA is defined as the geographical area within which all implemented small scale CDM programme activities (SSC-CPAs) included in the PoA occur. All energy efficient lighting equipment in the CPAs included in the PoA will be installed within the borders of the participating countries. Therefore, the boundary of the PoA is defined by the Host Parties listed in A.4.1.1 above.

For each SSC-CPA the project boundary will be defined by the specific location of the installed lighting equipment. The project boundary also includes the electricity grid to which those light fittings are connected. Each CPA-DD will provide specific geographic references and maps of the location of the SSC-CPA.

Applicable national and/or sectoral policies and regulations of each host country

South Africa

The South African Government has recognized the specific need for energy efficiency in the commercial and industrial sector since at least 2005, with the publication of the Energy Efficiency Strategy for South Africa. The Strategy sets a target for energy demand reduction in commercial and public buildings of 15% by 2015[7]. In the Strategy document lighting is identified as one of the key energy consumers in commercial and public buildings and as such the proposed PoA can be seen to align with the aims of the national approach to energy efficiency.

In addition, national utility Eskom has developed its Integrated Demand Management (IDM) program to improve national energy efficiency. Eskom's website states: "IDM is dedicated to ensuring short-term security of electricity supply through coordinating and consolidating the various initiatives aimed at optimising energy use and balancing electricity supply and demand. A key aspect of this demand side management programme is the promotion and implementation of more energy-efficient technologies, processes and behaviours amongst all consumers"[8]. Eskom's initiatives are discussed further below in section A.4.3 of the PoA-DD.

Botswana

The Botswana Government's National Energy Policy implementation Strategy[9] calls for "Improved energy efficiency for all energy sources in all sectors for economy, increased security and environmental protection". In its Energy Policy Goal 9, the Government has emphasised on energy efficiency to reduce

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[7] See page 15 of the Energy Efficiency Strategy of the Republic of South Africa, Department of Minerals & Energy, March 2005.

[8] Source: Eskom IDM website - http://www.eskomidm.co.za/home/about

[9] See page 4, http://pdf.usaid.gov/pdf_docs/PNADU851.pdf

energy waste. Further, the government has developed an energy efficiency building design guidelines[10] where various strategies for achieving energy efficient lighting are discussed, and recommendations are made for approaches to lighting design.

Kenya

Kenya's national energy policy has a number of broad objectives including ensuring the adequate, reliable, cost effective and affordable supply of energy to meet its development needs[11]. Promotion of energy efficiency and conservation is one of the Government's key energy policies. Kenya Vision 2030[12] has also recognised the need of increasing energy efficiency in order to reduce Kenya's higher energy cost.

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

>>The program involves the installation of energy efficient lighting equipment in public and commercial buildings. The PoA will target all non-residential buildings with a focus on large energy users across the following sectors:

- Office and Banking: Government and corporate offices, branches and outlets
- Retail: shopping centres, supermarkets and retailers
- Hospitality: restaurants, hotels and resorts
- Industry: mining, industrial possessing, manufacturing and warehousing

Note that this list of sectors is not exhaustive and any building outside the residential sector that satisfies the eligibility criteria stipulated in Section A.4.2.2 of the PoA-DD can be included in a SSC-CPA under the PoA. The PoA will only be applicable to existing buildings; greenfield property developments will not be eligible to participate in the PoA.

Through the PoA, a variety of energy efficient lighting technologies will be offered to participating building owners and occupiers, dependent on the scope and objectives of the lighting installation upgrade. "Up-lamping" is the simplest upgrade, involving simply exchanging existing comparatively inefficient lamps with new efficient retrofit equivalents. Refurbishment will allow for more extensive upgrading and achievement of greater efficiencies through the replacement of luminaires.

SSC-CPAs will typically involve the aggregation of a number of buildings where lighting equipment installations are undertaken. In general, each building retrofit will involve the following steps:

- A building audit to determine currently used baseline lamps and luminaires;
- Determination of appropriate technology substitutions in consultation with building owners and occupiers;
- Agreement with building owners and occupiers regarding the proposed retrofit and commercial terms (including ownership of CERs generated by the SSC-CPA);
- Installation of the replacement lighting technology, managed by either contractors or by the building manager;

[10] Energy Efficiency Building Design Guidelines for Botswana, Section 9, Lighting –Artificial and daylight

[11] See page 16, Kenya: Integrated assessment of the Energy Policy

[12] See page 8, Kenya Vision 2030, Government of Republic of Kenya

- Ongoing monitoring of the operation of efficient project lighting equipment (as per the monitoring plan detailed in Sections A.4.4.2 and E.7.2) to quantify energy savings and emissions abatement.

Note that this list is not prescriptive and SSC-CPAs may chose to undertake a different series of operational steps as long as it is approved by the coordinating entity and complies with the general requirements of the PoA and selected methodology.

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

>>A range of lighting technologies will be provided to businesses participating in the PoA. The technologies are available in the target countries and have been tested and proven internationally, although as discussed earlier they have had limited take up due to prevailing practices and other barriers. The CME will work with lighting suppliers who have experience in the design, engineering and manufacture of the technologies to be installed under the PoA. Lighting types to be installed under the PoA include, but are not limited to, tubular and compact fluorescent lamps, LED downlights and a range of speciality commercial lamps (high pressure discharge, induction lamps, linear LED etc).

For any type of lighting technology utilised under the PoA, there are five key drivers of lighting efficiency:

1. Efficient lamps
2. Efficient luminaires
3. Efficient ballasts
4. Efficient design
5. Efficient use and ongoing maintenance

It is a combination of all, or a number, of these five drivers that will determine the overall system efficiency of lighting found in commercial buildings. The technology options offered to building owners and occupiers participating in the PoA may cover all or a combination of these five drivers. It is envisaged, however, that the majority of activity under the PoA will be concerned with the first three areas through SSC-CPAs undertaking up-lamping and luminaire replacement. The coordinating entity will work with the SSC-CPA implementers and technology providers to design the correct mix of lighting products to ensure the greatest gain in efficiency, whilst taking into account budgetary, technical and operational constraints faced by each building owner or occupier.

The table below sets out the types of lamps and lighting technologies to be employed under the PoA, and those technologies to be replaced. CPA Implementers must utilise the lamps types specified in Table 1 in order for their projects to be eligible for inclusion under the PoA.

Table 1: Eligible Lamp Types

Baseline Lamp Types	Replacement Lamp Types
Incandescent lamps (GLS)	Compact Fluorescent Lamps (CFLs), LEDs (bulbs, tubes, and downlights), T8 & T5 fluorescent tubes
Fluorescent tubes (various sizes: T12, T8, U-tube, circular)	LEDs (bulbs, tubes, and downlights), T8 & T5 fluorescent tubes
T5 Fluorescent tubes	LEDs (bulbs, tubes, and downlights)
Halogen downlights	LEDs (bulbs, tubes, and downlights), CFLs, T8 & T5 fluorescent tubes

CFLs	LEDs (bulbs, tubes, and downlights)
HID gas discharge lamps (sulfur, metal halide, high pressure sodium, low pressure sodium)	Induction lamps, low pressure sodium, mercury vapour, metal halide, T8 & T5 fluorescent tube, LED (bulbs, tubes, and downlights)
Mercury vapour	Induction lamps, LED, T8 & T5 fluorescent tube, low pressure sodium, metal halide

In addition to lamps, efficiency improvements may be achieved through the retrofit or replacement of lighting equipment components such as ballasts, including electronic, standard magnetic, and energy efficient magnetic. Further, luminaires including reflectors, sensors (daylight and movement) and timers may be installed as part of CPAs and such energy savings included in CPA emission reduction calculations.

Each lighting system upgrade will involve the determination of the correct technology mix based on the operational requirements. Below is a list of some example lighting system applications:

General lighting
General lighting provides a uniform level of illumination over a large area. In some rooms, for example closets, storage rooms, utility rooms and garages, one luminaire or a group of luminaires can provide all necessary illumination. These indoor areas tend to be where the style and appearance of the room itself is secondary to the objects to be lighted, and cost is a deciding factor. The requirement is for good general lighting distribution, primarily horizontal illumination and no shadows. For SSC-CPAs under the PoA, warehousing and industrial applications will have a particular focus on general lighting technology options.

Architectural lighting
Architectural lighting aims to accentuate the features and specific elements of the space itself, like walls, ceilings, floors, etc, instead of the objects present. Luminaires for architectural lighting usually produce only modest amounts of illumination and are often chosen for their appearance (determined by lamp colour and temperature characteristics) as well, with complementary luminaires providing the room’s general or the task lighting. This type of lighting system may be particularly relevant in retail and some office building contexts.

Task lighting
As its name suggest, task lighting illuminates specific work areas like desk and counter-tops. Task lighting reduces the reliance on general overhead lighting and provides better quality lighting for specific tasks with lighting pointed directly at the work area. Most task lights are directional and local.

Accent Lighting
Accent lighting is used to highlight specific features within a room such as art objects in museums and special offers in shops. This type of lighting should not create too much brightness contrast. This type of lighting system application will be particularly relevant in the retail and hospitality sectors targeted under the PoA.

Ambient lighting
Ambient lighting is used to set the mood or ambience within a living or working space.
It is commonly a combination of general, architectural, task and accent lighting to create a highly specific

atmosphere in a room. Again this lighting system type will be particularly relevant in the hospitality and retail sectors, as well as, in office reception areas and meeting rooms.

Case study – Office lighting Fluorescent Tubes & Ballasts

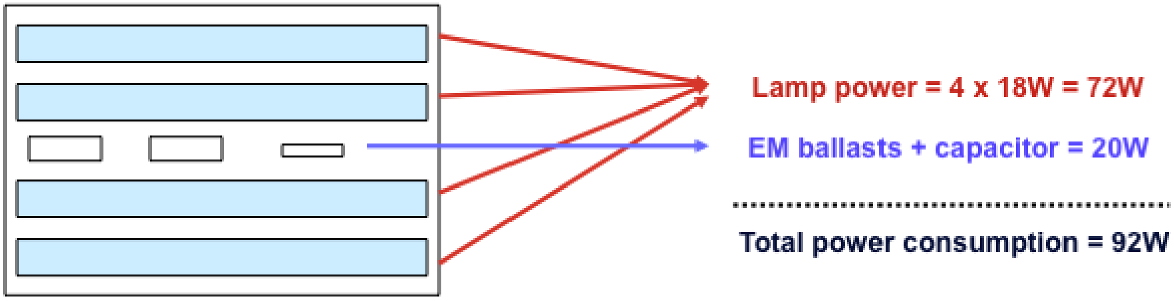
Within each of these lighting systems and across different building sectors, energy efficiency will be driven by the chosen combination of lamps, ballasts and luminaires. To illustrate this, it is useful to provide an example of technology options that could be part of a future SSC-CPA in a typical office building.

In typical office buildings, tubular fluorescent lighting can be the dominant lamp technology. Lighting efficiency in this technology type will be determined not only through more efficient lamps, but also ballast efficiency and luminaire type that can be installed as part of the retrofit process.

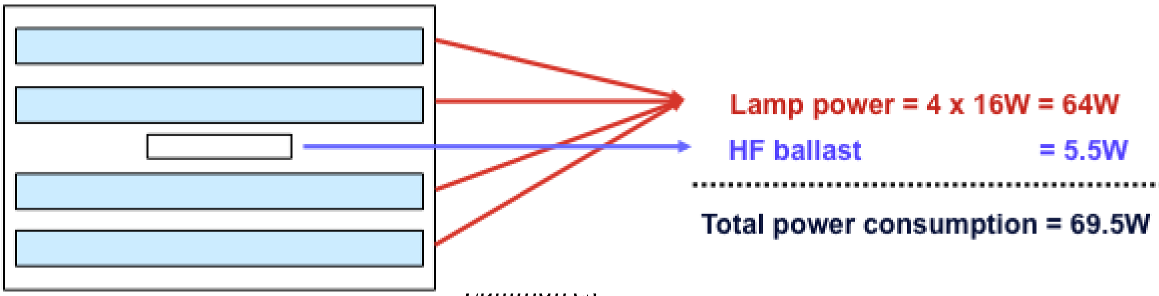
Figure 2 – T12, T8 & T5 fluorescent lamps

Baseline tubular fluorescent lamps are likely to be either T12 or T8 lamps, with replacement lamps likely to be either super efficient T5 or triphosphor T8 lamps. Figure 2 shows the size difference of each of these fluorescent tube lamps, T12s being the largest diameter and T5 the smallest. The choice of lamp is obviously very important, however, its combination with ballast and luminaire can deliver further energy saving benefits. The example below demonstrates the level of energy savings that are possible through the adoption of efficient ballasts when installed with the latest energy efficient lamps. In this case, low efficiency electro-magnetic ballasts are replaced with high frequency (HF) ballasts to deliver savings in excess of those possible through simple lamp-only retrofits.

Example baseline luminaire using fluorescent tube lamps with electro magnetic ballast

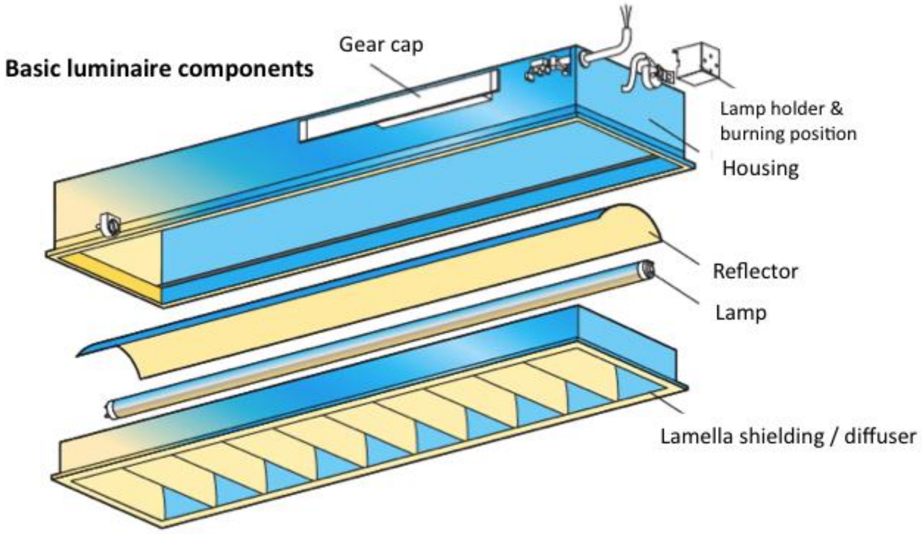


Example retrofit luminaire with efficient lamps and high frequency ballast



In the example above 25% energy savings are delivered through the combination of efficient lamp and ballast technology. In addition to these two components of an efficient lighting system, the luminaire also provides opportunities to create efficiencies. While the lamp is the primary source of light, reflectors and lamellae are required to help spread the light and direct it where it's needed. The luminaire is the apparatus that performs these functions. The luminaire can also act as a screen for glare and protects the lamp. It contains elements for distributing; filtering and transforming the light emitted by a lamp and includes all items necessary for fixing and protecting the lamp(s) and for connecting it (them) to the power supply.

Figure 3: Major components of a typical luminaire for fluorescent tube lamps.



The design of the luminaire, particularly the inclusion of reflectors and lamella, affects the light output ratio of the luminaire. Ensuring that the direction of the light from the luminaire is maximised towards functional tasks rather than lost through poor spatial alignment ensures that lamp and luminaire output is most efficiently utilised. The optic efficiency of the luminaire is an important contributor to the overall efficiency of the lighting system installed in a commercial or public building, and will be an important part of the technology options offered under the PoA.

In some cases lighting system retrofits may consist of 1 to 1 luminaire replacements whereby baseline luminaires, lamps and ballasts are removed and replaced with new highly efficient luminaires containing new lamps and ballasts. The combination of efficient lamps and ballasts along with luminaires with high optic efficiency may provide the opportunity to reduce the total number of lamps and/or luminaires required in a commercial building whilst maintaining or improving the overall light output.

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

>> Here only a description of criteria for enrolling the CPA shall be described, the criteria for demonstrating additionality of CPA shall be described in section E.5.

The eligibility criteria for the PoA have been determined using the latest procedure set out by the Executive Board at EB63 – *Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA (version 01.0).*

No.	Eligibility Criteria	Requirement
1.	The geographical boundary of the SSC-CPA is located within the geographical boundary specified in section A.4.1.2 of the PoA-DD.	The CPA implementer will provide evidence that the SSC-CPA to be included is located within the geographical boundary specified in section A.4.1.2 of the PoA-DD.
2.	The SSC-CPA complies with the established procedures for avoiding double counting set out in the PoA-DD and CPA-DD (generic).	The SSC-CPA will comply with the following established procedures for avoiding double counting: – check of CDM database to confirm project is not registered as an individual CDM activity or part of another registered PoA; – CME will confirm with building owners and occupiers participating in the proposed SSC-CPA that they are not participating in any other existing or proposed CDM project activity; and – unambiguous identification of the location and LPC Group classification of lighting systems according to the monitoring plan procedures.
3.	The SSC-CPA utilises lamps and other lighting equipment specified in section A.4.2.1 of the PoA-DD. The SSC-CPA employs lighting technologies/measures that comply with the following requirements: – meets relevant local or international performance standards as set out in the current version of the Standard Bank Energy Efficient Commercial Lighting Programme of Activities *Lighting Equipment Quality Requirements*; – for each replaced lighting appliance/equipment/system the rated capacity or output or level of service (e.g., lumen or lux output) will not be significantly	The SSC-CPA will utilise lamps and other lighting equipment specified in section A.4.2.1 of the PoA-DD. The SSC-CPA will confirm that lighting technologies/measures comply with the following requirements: – meets relevant local or international performance standards as set out in the current version of the Standard Bank Energy Efficient Commercial Lighting Programme of Activities *Lighting Equipment Quality Requirements*; – for each replaced lighting appliance/equipment/system the rated capacity or output or level of service (e.g., lumen or lux output) will not be significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.

	smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.	
4.	The start date of the SSC-CPA is to be confirmed with documentary evidence.	The start date of the SSC-CPA will be confirmed through the provision of one of the following forms of documentary evidence: – the date of signing an agreement with the CME; – the date on which an order for lighting equipment is placed; or – the date on which lights are installed.
5.	The SSC-CPA follows the baseline and monitoring methodology AMS IIC "Demand-side energy efficiency activities for specific technologies" and satisfies all applicability and other requirements set out in the methodology.	The SSC-CPA will confirm that the baseline and monitoring methodology AMS IIC "Demand-side energy efficiency activities for specific technologies" has been used and satisfies all applicability and other requirements set out in the methodology.
6.	The SSC-CPA is additional because it has demonstrated the presence of one or more of the barriers listed in section E.5.1 of the PoA-DD.	The CPA will demonstrate additionality by identifying at least one of the barriers that are listed in section E.5.1 of the PoA-DD.
7.	If applicable, the SSC-CPA has satisfied all requirements of the local Host Party for the completion of an environmental impact assessment.	The CPA will provide evidence that an environmental impact assessment has been conducted in cases where it is required by the Host Country. If an environmental impact assessment is not required by the Host Party, the SSC-CPA will provide the required evidence.
8.	A local stakeholder consultation process has been undertaken and the results are provided in the CPA-DD.	The SSC-CPA will provide evidence that local stakeholder consultation was conducted at a CPA level and the details of the meeting will be provided in the CPA-DD.
9.	The SSC-CPA involves the installation of energy efficient lighting in commercial buildings.	The SSC-CPA with confirm that the installation of energy efficient lighting is implemented within commercial buildings.
10.	The SSC-CPA will follow the sampling plan as described in section A.4.4.2 of the PoA-DD.	The SSC-CPA will confirm that the sampling plan is implemented as per section A.4.4.2 of the PoA-DD.
11.	The aggregate ex-ante estimated energy savings by the SSC-CPA do not exceed the equivalent of 60 GWh per year.	The SSC-CPA will confirm that the aggregated ex ante ener savings do not exceed the equivalent of 60 GWh.
12.	The SSC-CPA satisfies the latest	The CPA will demonstrate that it satisfies

	version of de-bundling rules for PoA.	the latest version of de-bundling rules for PoA.
13.	Any funding from Annex I parties does not result in a diversion of official development assistance (ODA).	The CME will confirm that any funding from an Annex I party involved in the implementation of the SSC-CPA does not result in a diversion of official development assistance (ODA).

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;
(ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;
(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;
(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

The information presented here shall constitute the demonstration of additionality of the PoA as a whole.

Introduction
As the proposed PoA is a voluntary and coordinated action of a series of small-scale projects, the assessment and demonstration of additionality will follow the requirements set in the *Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities*.

Section III/8 states that "*PoAs that will include one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of Attachment A of Appendix B (V8) of the "Simplified modalities and procedures for small-scale CDM project activities*".

Voluntary Coordinated Action
The PoA is a voluntary coordinated action initiated by the CME. All building owners and occupiers, and lighting technology providers participating in SSC-CPAs under the PoA will do so through a voluntary collaboration with the CME.

Barrier Analysis
By using revenues from the sale of CERs, the PoA aims to overcome the barriers to the uptake of more advanced efficient lamps. The CME may use structured carbon finance packages to offer building owners and/or occupiers an attractive option when purchasing new lighting equipment. In the countries covered by the PoA as for many African countries, energy efficient lighting in commercial and public buildings

face a number of barriers which the PoA will help to overcome, including: investment barriers, technology barriers, prevailing practices, lack of knowledge and split incentives[13].

The PoA will use a small-scale methodology, and as such, will assess additionality against one or more of the barriers listed in Attachment A to Appendix B (V8) of the *"Simplified modalities and procedures for small-scale CDM project activities".*

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

a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The discussion below constitutes the demonstration of additionality for the PoA as a whole. SSC-CPAs able to demonstrate that such barriers are present will be considered to be additional. SSC-CPAs may also choose to compliment their discussion of barriers with an investment analysis as per paragraph 7 of the "Guidelines for the objective demonstration and assessment of barriers" Version 01.

In the absence of the PoA building owners and occupiers would continue to utilize inefficient lighting technologies. Well-documented barriers[14] to the uptake of efficient lighting, including financial barriers, split incentives, lack of information, and common practice barriers are present in the commercial lighting sector in the countries covered by the PoA. Without the proposed CDM PoA there will not be an autonomously generated improvement in the energy efficiency of these countries' commercial buildings lighting systems to the same extent as delivered by the proposed PoA. The PoA is able to overcome such barriers by creating a consolidated carbon finance platform providing technology, information, services and access to capital.

1. Investment Barrier: the project activity cannot access appropriate capital without consideration of the CDM revenues, and as such a financially more viable alternative to the project activity would have led to higher emissions.

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[13] See for example the barriers discussed in the Energy Efficiency Strategy of the Republic of South Africa, Department of Minerals & Energy, March 2005; and the Energy Efficiency Strategy of the Republic of South Africa – First Review, Department of Minerals & Energy, October 2008.

[14] For a summary of these barriers, and their impacts in South Africa see section 3.2 (pages 10-12) of the Energy Efficiency Strategy of the Republic of South Africa, Department of Minerals & Energy, March 2005.; or Section 3.2 (pages 10-11) of the Energy Efficiency Strategy of the Republic of South Africa – First Review, Department of Minerals & Energy, October 2008.

Scaling-up investment in energy efficiency is essential to achieving significant reductions in energy related emissions. However, despite energy efficiency's recognised advantages as an investment with immense climate change mitigation benefits, most of energy efficiency opportunities remain unrealised due largely to the significant "investment gap" that exists between the theoretical returns that energy efficiency investments can provide, and the limited capital that is available to make those investments[15].

The International Energy Agency estimates that the buildings sector is responsible for 38% of today's world energy consumption, and is a source of considerable untapped efficiency potential[16]. This efficiency potential should be an attractive investment opportunity, as energy efficiency measures in the buildings sector generally have net-negative cost abatement opportunities. Whilst traditionally low energy prices have been identified as a major barrier to stimulating energy efficiency improvements[17], increasing electricity prices in South Africa for commercial building owners and occupiers has the potential to further improve the economics of energy efficiency investments. Prices approved by the National Energy Regulator of South Africa (NERSA) will result in annual increases in the average tariff of approximately 25% between 2010 and 2013[18]. However, it is the higher upfront costs, and additional financing requirements that they bring, that acts as a considerable barrier to the take up of energy efficiency opportunities, including in energy efficient lighting equipment.

In the context of commercial and public building energy efficient lighting, investment barriers come in two interrelated forms which the PoA helps to overcome:

1. The capital intensive nature of whole-of-building energy efficient lighting retrofits; and
2. The perception that energy efficiency investments are high-risk which discourages deployment of any available capital.

1.1 Capital Intensive Nature of Whole-of-Building Retrofits

The high up front costs of energy efficient lighting presents a significant barrier to building owners and occupiers wishing to switch their lighting to more efficient technologies. Undertaking a whole-of-building retrofit represents a considerable up front investment when compared to the progressive maintenance and replacement of existing lights over time. Each SSC-CPA under the PoA will require that a large number of functional lamps be replaced before the end of their useful lifetimes to avoid additional electricity consumption and emissions. Without the PoA in place it is unlikely that commercial building owners and occupiers will undertake such large scale investments, particularly given that such investment is not targeted at increasing their production or business growth, but rather at reducing costs over time in an area that is unlikely to be core to their day-to-day operations. This is supported by a recent statement from the Principal Engineer in the Ministry of Minerals, Energy and

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[15] See pages 7 and 27 of International Energy Agency, 2010. "Money Matters – Mitigating risk to spark private investment in energy efficiency". Information Paper, Energy Efficiency Series. Paris, September, 2010. This reference provides considerable detail on the various risks perceived by investors when evaluating energy efficiency projects.

[16] See page 524, International Energy Agency (2008), *Energy Technology Perspectives*. Paris: OECD/IEA. Note that this figure includes all building types: commercial and residential.

[17] See page 10 of Energy Efficiency Strategy of the Republic of South Africa – First Review, Department of Minerals & Energy, October 2008, for a discussion of low energy prices acting as a barrier for energy efficiency.

[18] See page 1 (first paragraph) of NERSA Media Statement 24th February 2010 "NERSA's decision on Eskom's required revenue application – multi-year price determination 2010/11 to 2012/13 (MYPD 2)", available at: http://www.nersa.org.za/

Water Resources in Botswana that indicated that "SME's energy efficiency equipment are costly as all the equipment in Botswana are imported from South Africa or other countries".[19] Similarly, access to finance has been identified as one of the barriers in Kenya for the adoption of efficient technologies and cleaner energy options. A study conducted by the United Nations Environment Programme (UNEP) suggests promoting access to micro-finance or other innovative financing mechanisms to remove such barriers[20].

In addition to the quantity of lights requiring replacement acting as a deterrent to end users, there is a substantial price difference between existing technologies and those being retrofitted. For instance, new LED downlights lamps can be eight to times more expensive than conventional dichroic halogen equivalents[21]. So, not only does the retrofit represent a large-scale investment, but also an investment in untested technologies at a significant premium to baseline equipment. As is discussed further below in the context of prevailing practice, such risks and barriers make the implementation of the proposed project activities unlikely in the absence of the PoA.

The PoA will address access to capital barriers by providing an integrated solution for the purchase of lights, offering organizations reduced costs and attractive payment terms through leveraging carbon revenues. The PoA financing structure removes the up front costs of the lighting replacements, enabling building owners to pay off the lights over time out of the energy cost savings they realize. CER revenues will enable the project proponents to provide financing and lower lamp and equipment pricing for the participating building owners and occupiers, thereby greatly improving the access to finance for the large-scale implementation of energy efficient lighting.

The use of CERs as collateral to reduce lending risk is an important feature of the PoA that helps to remove the investment barrier. Whilst Standard Bank does have lending products available for energy efficiency equipment procurement, their utilisation is low or in the case of lighting, non-existent[22]. Standard Bank is able to confirm that it has never provided an energy efficiency loan ("pay-as-you-save") for an efficient lighting retrofit in the countries covered by the PoA. Specifically in the case of lending for lighting technology, this lending is viewed as unsecured due to the fact that the bank will not be able to take security over light fittings (and even if it did it would be very difficult to enforce). As such, although Standard Bank may offer these products, current utilization is very low, particularly given the lack of security when lending against lighting products. Clearly, without the CDM the provision of financing for lighting retrofits is very difficult to access. Even for more credit worthy clients, interest rates for unsecured lending will be higher than for secured loans. As such, the securitization of the future CER revenue by Standard Bank allows it to improve the terms of financing offered for efficient lighting projects, thereby reducing the access to finance barrier. This also broadens the scope of companies to which Standard Bank can provide finance, meaning that many SMEs who previously would have been unable to access unsecured finance for energy efficient lighting equipment, the PoA may make such

[19] "EU advises SMEs on Energy Efficiency", The Economic Insight, 20th April 2011, which can be accessed at http://www.theeconomicinsight.com/?p=38

[20] See page 50 of the Kenya: Integrated assessment of the Energy Policy by UNEP, available at: http://www.unep.ch/etb/areas/pdf/Kenya%20ReportFINAL.pdf

[21] Pricing estimates are based on discussions with lighting suppliers in South Africa, and evidence from local lighting retailers. For example, an LED downlight from Light Savers (www.lightsavers.co.za) costs between R185 and R250, whereas an equivalent halogen product from Pick 'n Pay (www.pnponline.co.za) costs between R34 and R50.

[22] Information provided by Standard Bank Corporate and Investment Banking team in South Africa. This business unit has responsibility for the provision of equipment finance solutions, including for energy efficiency upgrades.

funding available. As such the CDM will make a difference to the viability of an upgrade for all African companies.

1.2 Risk Perceptions

Investments in energy efficient lighting equipment not only face barriers due to a lack of available capital, but also due to the perception that such investments are high risk. International studies[23] show that uncertainty regarding realisable cost savings, and therefore return on investment, is a major reason for companies avoiding investment in energy efficiency. In such cases a commercial building owner and/or occupier may have access to finance, but choose not to invest it in energy efficient lighting because of concerns that it will not deliver costs savings as promised, or because they choose to invest the money elsewhere. South Africa's National Energy Efficiency Strategy touches on such barriers in its discussion of "bounded rationality", that is "the use of imperfect, or incomplete, information and less than fully rational procedures" when it comes to procuring energy efficiency technologies or services. The strategy goes on to state: "this is significant as the majority of energy consumers currently have imperfect information regarding the range and performance of energy efficient products. This fact inevitably results in poor decision making when purchasing goods or specifying equipment."[24]

The International Energy Agency identifies two key challenges for energy efficiency investments that the PoA effectively overcomes. Firstly, that "contrary to other investments, energy efficiency cannot be directly measured in terms of incremental physical production. Rather, it is measured as a savings or decrement against a baseline of consumption or expense. The result is perceived complexity, which manifests itself through requirements for monitoring and verification (M&V) to confirm the savings"[25]. Secondly, uncertainty regarding a non-expert's ability to properly implement energy efficient technologies leads potential investors (in this case building owners or occupiers) to have concerns over the level of technical and operational risks.

The PoA helps to overcome these information and perception barriers which impede investment in energy efficient lighting equipment by providing a consolidated source of information, technology and services, and also by predicating capital investments by building owners and/or occupiers on demonstrated energy savings using an internationally recognised and endorsed M&V protocol. The CDM monitoring and reporting requirements, to which the project proponents themselves are held in order to generate CERs, also serve to provide the certainty of realised energy savings required by investors to deploy capital in energy efficient lighting systems for their buildings. Both the financial incentive of CERs, and the United Nations endorsed monitoring framework provided by the CDM are critical to overcoming the perceived risks of investment which are driven by lack of information, both technical (equipment specifications, installation and maintenance requirements etc) and monitoring data (actual energy savings results).

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[23] See for example, Clinton Climate Initiative, 2009. "An Introduction to Energy Performance Contracting", for a discussion of the benefits of energy performance contracting as a tool to overcome project performance risks in energy efficiency upgrades (page 3); see also pages 22-26 and p.195 for a discussion of barriers to energy efficiency and the importance of access to information in International Energy Agency/OECD, 2007"Mind the Gap: Quantifying Principal-Agent Problems in Energy Efficiency". In support of the G8 Plan of Action. Paris.

[24] Energy Efficiency Strategy of the Republic of South Africa, Department of Minerals & Energy, March 2005, page 11-12.

[25] International Energy Agency, 2010. "Money Matters – Mitigating risk to spark private investment in energy efficiency". Page 8. Information Paper, Energy Efficiency Series. Paris, September, 2010.

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

Many of the energy efficient lighting technologies offered under the PoA may be relatively new, with a low level of awareness amongst consumers and building managers, and even lower levels of operating experience. The innovative nature of some of the lighting technologies, combined with their higher cost, as well as the capital intensive nature of a whole-of-building lighting retrofit combine to create strong preferences for continued utilization of existing lighting systems and technologies. International studies[26] show that uncertainty regarding realisable cost savings, and therefore return on investment, is a major reason for companies avoiding investment in energy efficiency.

Building owners, occupiers and facility maintenance personnel may have a limited understanding of the benefits of energy savings on lowering whole-of-life lighting costs, and as such continue to purchase and use existing, inefficient lighting technology which is perceived as being cheaper, familiar and risk free. South Africa's National Energy Efficiency Strategy also describes the "frequently encountered misconception, particularly within industry, that energy efficiency will disrupt production processes and that changes should not be made unless absolutely necessary."[27] Similarly, inefficiency in energy use has been identified as one of the factors impeding the competitiveness of the Kenya's products in international markets[28].

Because of the poor understanding of the benefits of energy efficiency, building owners, occupiers or managers may not easily identify the savings associated with new lighting technologies. In addition, the challenge of monitoring and quantifying realized cost savings (electricity and lamp replacement) for individual building owners, occupiers or facilities managers, and the potential risk of poor technology performance mean that the ongoing use of existing lighting technologies is highly likely. The monitoring protocol provided by the CDM is independently assessed as part of both the validation the verification processes, and as such participating building owners and managers are assured of an unbiased assessment of the energy savings generated by the lighting systems installed.

3. Barrier due to Prevailing Practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions

The discussion above has already detailed the persistent preference of building owners, occupiers and facility managers to continue to use familiar, cheaper but more inefficient lighting equipment. In addition, the project proponents are not aware of any other activities (such as government policies or regulatory requirements) similar to the PoA (outside of CDM-based initiatives which are excluded from this analysis) occurring in most of the participating countries. However, in some countries covered by the

[26] See for example, Clinton Climate Initiative, 2009. "An Introduction to Energy Performance Contracting"; and International Energy Agency/OECD, 2007, for a discussion of the benefits of energy performance contracting as a tool to overcome project performance risks in energy efficiency upgrades (page 3). See pages 22-26 and p.195 for a discussion of barriers to energy efficiency and the importance of access to information in . "Mind the Gap: Quantifying Principal-Agent Problems in Energy Efficiency". In support of the G8 Plan of Action. Paris.

[27] See page 11 of the Energy Efficiency Strategy of the Republic of South Africa, 2005

[28] See page 5 of the Kenya: Integrated assessment of the Energy Policy by UNEP, available at: http://www.unep.ch/etb/areas/pdf/Kenya%20ReportFINAL.pdf

PoA, residential energy lighting projects are being implemented. These projects are clearly different to the proposed PoA because the PoA targets commercial lighting efficiency not the residential lighting efficiency. A summary of such initiatives is described below.

In South Africa, the national utility Eskom is undertaking a series of lighting efficiency programs. Eskom has implemented mass distributions of CFLs to households since 2005. In 2010 and 2011 Eskom has also introduced programs aimed at improving the adoption of energy efficient equipment in commercial buildings by providing subsidies, grants and rebates for retrofit projects and specific technologies. Of particular relevance is the Standard Offer Program and LED rebate initiative. Both of these programs involve providing grant-based payments to building owners or project implementers that install energy efficient lighting equipment. These payments are based on the expected peak demand savings delivered by a lighting project.

In Botswana as a project to encourage efficient use of energy, the national utility Botswana Power Corporation, has installed 1 million Compact Fluorescent Lamps (CFL's) in households. In Kenya, the public utility company-Kenya Power and Lighting Ltd (KPLC) previously distributed CFLs to residential users to improve household energy efficiency.

The only similar options involving efficient lighting initiatives in commercial buildings are those managed by the utility Eskom in South Africa. However, there are essential distinctions between the aforementioned activities by Eskom and the proposed PoA. The Eskom programs are entirely grant based – there is no obligation on project implementers or building owners to repay funding received. Eskom is able to provide such funding because it has regulatory approval from the government’s National Energy Regulator of South Africa to recoup its expenditure on demand side management programs through the tariffs paid by all electricity users in South Africa[29]. As such, the program proponents have concluded that the proposed PoA has essential differences with the Eskom energy efficiency subsidies and therefore cannot be considered common practice.

Further, as per the *Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios*, Version 2 (EB22 Annex 3), the Eskom incentives can be considered an E- sectoral policy (e.g. public subsidies to promote the diffusion of renewable energy *or to finance energy efficiency programs*) and as such need not be taken into account in developing a baseline scenario and hence the additionality of the PoA.

4. Other Barriers - Split Incentives

In addition to building owners and occupiers continuing to utilise existing technologies as risk mitigation strategy, there is a further barrier to energy efficient lighting that is prevalent in the commercial building sector: split incentives.

Split incentives occur when two participants in an economic exchange have different or even competing goals or incentives. In the context of energy efficient lighting in commercial buildings, such split incentives occur when building owners are required to pay for building equipment upgrades, but it is tenants that are required to pay for electricity bills. In this situation, the entity making the investment (landlord) receives no benefit (energy cost savings), because such benefits accrue to the building occupants (tenants). Tenants are also unlikely to make the investment themselves because they ultimately

[29] See page 18: NERSA Issues Paper, “Eskom Revenue Application Multi Year Price Determination 2010/11 to 2012/13 (MYPD 2).” Published 30 October, 2009.

will not own the equipment installed in the building, and may leave the building before enough energy savings have accrued to pay for the initial investment in efficient lighting equipment.

By providing CER revenue to building owners investing in energy efficient lighting technology, the PoA can overcome the split incentive barrier. CER revenues provide a monetary 'payback' to building owners who may not necessarily receive the benefit of reduced electricity costs which are passed through to their tenants.

Conclusion: Barrier Analysis

The aforementioned barriers are critical to demonstrating the additionality of all activities that occur under the PoA. The PoA provides a framework to overcome barriers to the uptake of energy efficient lighting in three main ways:

- Providing a coordinated, well-resourced and incentivized commercial structure to provide information, raise awareness and actively market the large-scale uptake of energy efficient lamps to building owners/occupiers.
- Reduce the upfront cost of efficient lighting retrofits through structured carbon finance. By using CER revenues, the project proponents hope to be able to significantly reduce the financial barriers to the uptake of energy efficient technologies.
- Provide a project management and monitoring service that may facilitate the initial installation of lighting equipment, as well as the ongoing quantification of energy savings.

By providing up to date information, access to the latest technology, M&V services and innovative finance solutions the PoA aims to overcome many of the barriers to the uptake of more efficient commercial lighting technologies.

Based on the above analysis of these barriers the PoA is considered to be additional.

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

A.4.4.1. Operational and management plan:

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

- A record keeping system for each CPA under the PoA,
- 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,
- The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity;
- The provisions to ensure that those operating the CPA are aware of, and have agreed that their activity is being subscribed to the PoA.

The CME has prepared an operating manual for the PoA covering all operational activities, including: CPA Inclusion Management System Processes, CPA Inclusion Management System Supporting Documents, Roles and Responsibilities, Arrangements for Training and Capacity Development of Personnel, Procedures to Avoid Double Counting, Records and Documentation Control Processes, CPA Inclusion Management System Continuous Improvement, and CPA-IMS Compliance with EB

Requirements. A copy of the *CPA Inclusion Management System* was provided to the DOE during validation.

Operational Activities

The table below summarises the range operational activities of the PoA required to implement and manage each SSC-CPA. The coordinating entity has divided these operations into seven broad categories and has defined the management responsibilities for each as detailed in the table below.

Table 3: Operation and Management of the PoA.

Operational Area	Management Responsibilities & Arrangements
Baseline Study	– Undertake building survey and audit of existing baseline lighting equipment, and record results in project database. – Select a sample of LPC groups
Product Supply & Logistics	– Ensure timely production of energy efficient lighting equipment for each building retrofit. – Transport of equipment to the target countries and storage prior to installation. – Break bulk product supplied into individual client job allocations, distribute new equipment to client sites and remove old equipment.
Product Installation	– Lighting supplier, or other contractors will be responsible for conducting the installation of new lighting equipment in target buildings. – Contractor will be required to sort and pack old product and enter specifications of all replaced lighting equipment into project database.
Collection & Processing of Baseline Technology	– Collection of baseline lighting equipment from buildings. – Undertake independently verified scrapping of baseline lighting equipment.
Quality Assurance	– Conduct post-installation site visits at a sample of buildings to check quality of installations – Check metering equipment is installed correctly and functioning – Reconcile project database records of baseline equipment with newly installed lighting equipment to ensure equivalence, no leakage or theft.
Monitoring Emission Reductions	– Installation of metering equipment in sample LPC groups. – Continued monitoring of sample LPC groups for duration of crediting period. – Periodic collection of monitoring data. – Preparation of monitoring reports for emission reduction verification.
Product Maintenance	– Provide ad hoc equipment replacements in line with stipulated warranty period (to be determined on a case-by-case basis) – Undertake scheduled servicing to replace all lamps after a five year period (optional servicing approach, to be agreed on a case-by-case basis).

Record Keeping System

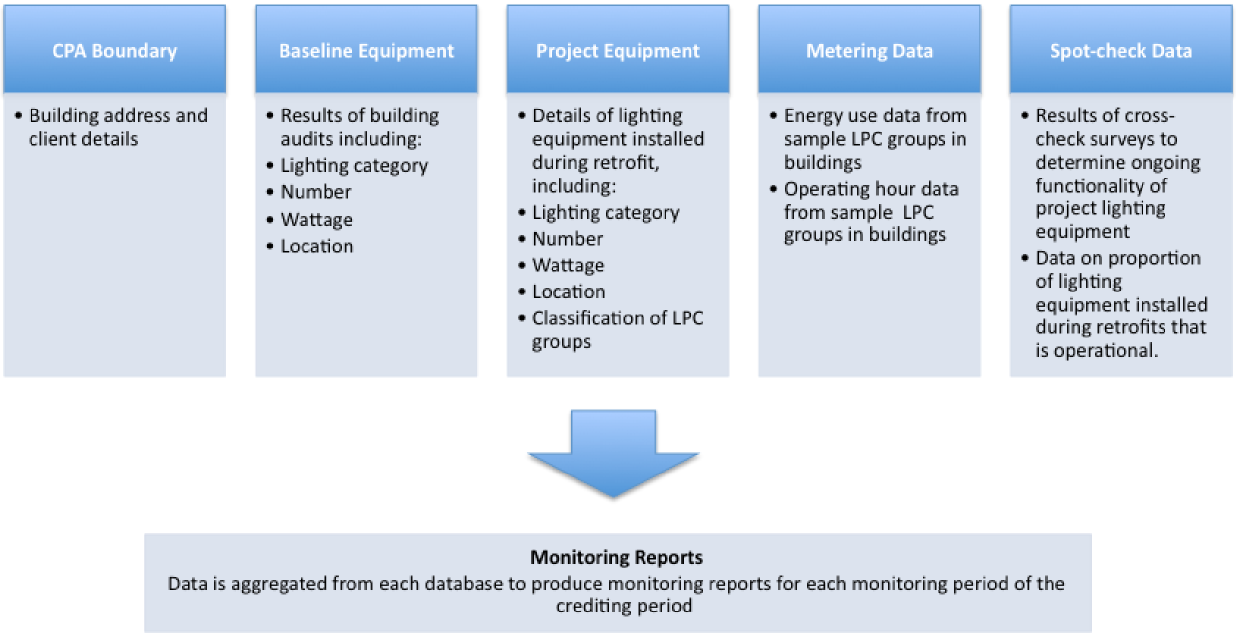
Each SSC-CPA will follow the record keeping and monitoring requirements stipulated in AMS II.C. version 13 and detailed in Section E below. In summary, the CME will ensure that for each SSC-CPA appropriate records will be kept documenting the following information:

- The geographical location of each SSC-CPA including the address, GPS coordinates and client entity responsible for each building involved in retrofit activities.
- The results of baseline audits conducted to determine current lighting equipment in use in the participating buildings.
- A record of the product specifications of new energy efficient equipment installed in exchange for baseline equipment.
- A record of Last Point of Control (LPC) groups for monitoring purposes.
- Records of equipment scrapping procedures, including reports provided by independent verifier involved in cross-checking baseline equipment destruction.
- Monitoring data collected from sample LPC groups, including:
    - Usage data post-installation of efficient lighting equipment.
    - Ongoing functionality of installed lighting equipment collected during spot check surveys.

The CME will be responsible for the management of records and data associated with each SSC-CPA. Data will be stored in secure project databases for the duration of each SSC-CPA crediting period, plus two years. The information stored in the databases will be used as the basis of the production of monitoring reports used to quantify emission reductions and claim CERs.

The diagram below summarises the record keeping system, in particular the content of each of the project databases.

Figure 4: Summary of Record Keeping System & Project Databases



System to Avoid Double Counting
The CME will implement a system to avoid double counting of emission reductions. This system will avoid the situation where a new SSC-CPA that has been already registered either as a CDM project activity, or as a CPA of another PoA, is included under the PoA.

Prior to registering a new SSC-CPA within the proposed PoA, the CME will check the CDM project database to establish whether a CDM project activity or CPA of another PoA utilising energy efficient lighting technologies has already been registered involving the same buildings. Given that each SSC-CPA included in the PoA will be identified by geographical location of buildings where retrofits occur (address, GPS location data and building name), it is possible to unambiguously identify CPAs or CDM project activities potentially operating in the same area. In addition, the CME will confirm with building owners and occupiers participating in the proposed SSC-CPA that they are not participating in any existing or proposed CDM project activity. If the CME identifies that there is an existing or proposed CDM activity involving the buildings targeted by the SSC-CPA, then those buildings will be excluded from participating in the PoA.

In addition, the CME will ensure that all parties involved in the implementation of a SSC-CPA have agreed to assign CERs to this PoA. This will avoid the situation whereby lighting suppliers or installers involved in SSC-CPA implementation claim the same emission reductions as CERs for another CDM project or PoA. The CME will establish appropriate legal agreements with the SSC-CPA implementers to ensure that the ownership and assignment of CERs in respect of the PoA is clear, and avoids the possibility of emission reductions being double counted.

De-bundling
As per the latest version of the '*Guidance for determining of debundling under a Programme of Activities*' (v.3 EB 54), if each of the independent subsystems/measures included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied (in this case the 60GWh per year), then that SSC-CPA of PoA is exempted from performing de-bundling check i.e., considered as not being a de-bundled component of a large scale activity.

In the case of energy efficient lighting retrofits proposed under the PoA, annual energy savings of individual pieces of lighting equipment will be considerably lower than the 1% threshold level (ie. less than 600,000 kWh of energy savings per year), and as such SSC-CPAs are considered as not being a de-bundled component of a large scale CDM activity. The example below clearly demonstrates the compliance of project activities with the debundling requirements of small-scale PoA:

Existing lighting equipment = 50W halogen down light + 7W transformer
System power consumption = 57W

Replacement lighting equipment = 10W LED down light + 7W transformer
System power consumption = 17W

Usage = 12 hours per day, 340 days per annum

Annual Energy Savings = Exiting equipment annual usage – Replacement equipment annual usage
= ((57 x 12 x 340)/1000) – ((17 x 12 x 340)/1000)
= 232.6 – 69.4
= 163.2 kWh

As can be seen from this simple example individual lighting units will not exceed the 1% threshold amount of 600,000 kWh per annum.

Participants subscribed to the PoA
The CME is responsible for co-developing and managing all SSC-CPAs to be included in the proposed PoA. This will mean that those operating the SSC-CPA will be aware and will have agreed that their activity is subscribed to the proposed PoA. Legal agreements will be put in place with participating building owners and occupiers, as well as operational and technology partners clearly stipulating that their activities are subscribed to the PoA.

A.4.4.2. Monitoring plan:

>> The following information shall be provided here:

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

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

The CME will implement a verification system at the PoA level to determine the emission reductions created by the PoA as a whole. The program database will include the data set that can be directly attributed to each SSC-CPA within the PoA (as depicted in Figure 4 above). The project database allows for unambiguous determination of the emission reductions attributable to each SSC-CPA:

- A list of buildings and clients participating in each SSC-CPA including name, address, GPS coordinates, lighting equipment removed and installed, LPC groups, date and location of the exchange transaction.

This SSC-CPA specific information will be combined with monitoring data obtained from the PoA-level sample groups:
- Metering data collected from the Project Sample Group LPCs relating to the ongoing usage of project lighting equipment during each monitoring period;
- Data obtained from Project Cross-Check Group LPCs indicating the proportion of project lighting equipment operating in each CPA during each monitoring period.

The coordinating entity will produce a monitoring report for the verifying DOE corresponding to the preceding monitoring period of each SSC-CPA. This report will unambiguously present the data relating to the emission reductions generated by each SSC-CPA during the monitoring period.

PoA record keeping procedures will prevent double counting across SSC-CPAs. The data set corresponding to each SSC-CPA will be mutually exclusive of the data set of another SSC-CPA under the PoA. The list of buildings and associated technology retrofits and refurbishments that constitute the project boundary of each SSC-CPA cannot contain any duplicate entries. This duplication rule applies

within each SSC-CPA (ie. a specific retrofit activity cannot appear more than once in each SSC-CPA), and *between* SSC-CPAs (ie. a specific retrofit activity cannot appear in more than one SSC-CPA).

Verification of each SSC-CPA will occur at the end of each monitoring period. The project database will record the start and end dates of each monitoring period, and record the emission reductions attributable to each monitoring period. Appropriate record keeping procedures will be implemented to ensure that each monitoring period data set can be transparently attributed to its corresponding SSC-CPA, preventing any occurrences of double counting. An audit of the project database will be able to determine the current status of each SSC-CPA – the duration of previous monitoring periods, the buildings and sample groups delivering monitoring data, and current verification activities.

SAMPLING PLAN

The sampling complies with the *Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities (version 2.0)* (EB65 Ann2). The purpose of sampling is to obtain unbiased and reliable estimates of the mean value of parameters used in the calculations of greenhouse gas emission reductions. 'Unbiased' in this case indicates that the sampling will not systematically underestimate or overestimate the mean value determined.

For the Standard Bank Energy Efficient Commercial Lighting Programme of Activities representative samples of the Last Point of Control (LPC) will be monitored at the PoA level. LPC is defined as the portion of an electrical circuit that serves a set of lights that is controlled on a single switch. As a result, all of the lights on that LPC are operated the same number of hours per year. An example of an LPC would be a set of lighting fixtures in a room that operate on a single switch.

The sampling approach consists of grouping the population of LPCs into "usage groups" from which samples are drawn. Usage groups are subsets of the entire population of LPCs that fall within certain average operating hours groups as shown in the Table 4. This grouping technique subdivides a large, heterogeneous population into smaller groups that are more homogeneous. The LPCs will be initially classified into 8 groups as shown below:

Table 4: Classification of LPC

LPC Classification	Average operating Hours (H) per day
Group I	$0<H\leq3$
Group II	$3<H\leq6$
Group III	$6<H\leq9$
Group IV	$9<H\leq12$
Group V	$12<H\leq15$
Group VI	$15<H\leq18$
Group VII	$18<H\leq21$
Group VIII	$21<H\leq24$

Based on the monitoring results obtained the CME may choose to increase or decrease the number of LPC Groups or reclassify LPC Groups in subsequent monitoring periods. If there is any reclassification, it is to ensure that the sample is the best representation of the population as a whole whilst minimising redundant metering.

In order to estimate ex-ante energy savings and emission reductions for each CPA under the PoA, the CME will initially classify each LPC into the groups by estimating its average operating hours per day. The CME will obtain the required estimation of operating hours by any of the following methods:

(a) The building operator's knowledge of average operating hours of LPCs; or
(b) Prior study on average operating hours of the LPCs; or
(c) Metering a randomly selected sample of LPCs to obtain the average operating hours; or
(d) Recording the daily operating hour data of the LPCs for a certain period of time.

Sampling Objective

The sampling objective is to determine:

i. Mean value of the operating hours per LPC group for each monitoring period during the crediting period

ii. Proportion of operating lamps within each LPC group for each monitoring period during the crediting period.

Field Measurement Objectives and Data to be collected

i. Mean value of the operating hours per LPC group

The operating hour data of a representative sample of LPCs across each LPC group will be monitored for the duration of the crediting period. The LPCs in the sampling group, also known as the Project Sample Group (PSG), will be monitored to obtain the number of operating hours. Monitoring meters will be installed for this purpose. Depending on the site-specific conditions, the monitoring meter may be placed on the LPC or on any lamp that is controlled by the target LPC. The monitoring meter that is installed on the lamp or on the LPC will monitor the operating hours of the target LPC. The data collected from these monitoring meters will be extrapolated to the respective LPC groups.

ii. Proportion of operating lamps within each LPC group

The proportion of operating lamps under each LPC group for each CPA will also be surveyed periodically. The results obtained from the periodic survey of the proportion of operating lamps in the Project Cross Check Group (PCCG) will be extrapolated to the relevant LPC groups of the CPA

Target Population and Sampling Frame

The LPCs will be classified based on their ex-ante estimated daily average operating hours. This means that each of the classified LPC groups will have different daily average operating hours and hence will have different abatement potentials. This requires them to be monitored separately to determine the emission reductions for the PoA and underlying SSC-CPAs. The target populations of the sampling are initially eight LPC groups implemented in the PoA.

Sample Method:

The selected sampling method is stratified random sampling. When sub-populations vary considerably, it is advantageous to group elements into relatively homogeneous subpopulations and sample each

subpopulation independently. The LPCs groups will be classified based on their estimated daily operating hours, and a representative sample of LPCs under each LPC groups will be monitored. The LPC groups are mutually exclusive and they are also collectively exhaustive: no population element is excluded.

Desired Precision/Expected Variance and Sample Size

Project Sample Group (PSG):

A Project Sample Group (PSG) will be established for each of the LPC groups. The purpose of establishing the PSGs is to monitor a representative sample of all participating buildings and lighting systems in the PoA.

Sample size for the project sample group (PSG) is determined at the PoA level, therefore the sample size will be calculated based on 95/10 confidence/precision as outlined in the paragraph 19 of the "Standard for Sampling and Surveys for CDM Project Activities and Programme of activities (Version 02.0)".

Sample Size

The minimum sample size per LPC group will be estimated by using the following formula:

$$n = \frac{Z^2 V}{e^2} \quad \text{(Equation 1)}$$

Where:

n = sample size

Z = Z value, 1.96 for 95% confidence

e = desired level of precision (i.e +/-10%)

$$V = \left(\frac{SD}{mean}\right)^2 = CV^2$$

CV = coefficient of variation (initially taken as 0.50 to be conservative)

Therefore, for a confidence level of 95% with +/-10% precision, and a CV of 0.5, the estimate of required sample size n for infinite population size will be:

$$n = \frac{1.96^2 \times 0.25}{0.1^2} = 97$$

When the population under study is relatively small, a finite population correction factor is employed. The finite population adjustment equation is as follows, with n* being the new sample size corrected for population size:

$$n^* = \frac{Nn}{n + N}$$ (Equation 2)

In order to establish the minimum sample size at the PoA level, the CME will utilize the following table that has been calculated by applying equations 1 and 2.

Table 5: Sample Size

Precision	+/-10%
Confidence	95%
Z- Value	1.96
Population Size, N	Sample Size, n*
4	4
8	8
12	11
16	14
20	17
25	20
30	23
35	26
40	29
45	31
50	33
60	38
70	41
80	44
90	47
100	50
125	55
150	59
175	63
200	66
300	74
400	79
500	82
Infinite	97

To account for monitoring equipment failure and loss, the estimated sample size will be increased by 10% and then rounded up to the next integer. Therefore for an infinite size of population the sample size including 10% oversampling would be 107 LPCs per LPC Group

For finite size of population, the sample size will be as stipulated in the table above. For example, if there is a single CPA under the PoA and the CPA has a population size of 100 for a particular LPC Group, then the sample size for that Group at the PoA level would be 54 (i.e. 49+10% oversampling).

Project Cross Check Group (PCCG):

In the Project Cross-Check Group (PCCG), a non-metered sample of LPCs will be surveyed periodically or at least annually over the crediting period for each CPA to measure the proportion of equipment installed under the programme that is still in operation. The result of this sampling is then applied to the calculation of project emission reductions for that period.

Sample size for the Project Cross Check Group (PCCG) will be determined at the CPA level therefore the sample size for the PCCG will be calculated based on 90/10 confidence/precision as per the "Standard for Sampling and Surveys for CDM Project Activities and Programme of activities (Version 02.0)".

The LPCs included in each PCCG will be randomly selected from the database of participating LPCs in each LPC Group. Each PCCG will include a statistically representative number of samples from each LPC Group. The sample size of each PCCG will be calculated based on the following equation:

$$n = \frac{Z^2 V}{e^2}$$

Where:

n = sample size

Z = Z value, 1.645 for 90% confidence

e = desired level of precision (i.e +/-10%)

$$V = \frac{p(1-p)}{p^2}$$

p = expected proportion (taken as 0.5 to be conservative)

Therefore, for a confidence level of 90% with +/-10% precision, and p of 0.5, the estimate of required sample size n for infinite population size will be:

$$n = \frac{1.645^2 \times 1}{0.1^2} = 271$$

This is the minimum sample size for each PCCG. To be more conservative the CME may choose to increase the number of sample size in each group. Random selection of LPC samples will ensure the inclusion of all lighting technologies within the sample.

The procedure of conducting this survey will be as follows:
Random LPC numbers from the database will be generated for each LPC Group under each CPA. LPC numbers will be randomly generated until the number of lamps controlled by each LPC Group corresponds to at least 271 lamps. Once the number of lamps reaches 271 in each Group, the random generation of LPC numbers will be stopped. If there are less than 271 lamps in a Group then all the lamps in that group will be monitored. If the CME has chosen to increase the sample size then the procedure will be repeated until the desired number of samples are obtained. All the lamps controlled by each sample LPCs will be surveyed and the result will be applied to the calculation of project emission reduction for that period.

Some CPAs may not have all eight LPC Groups. In such instances, obviously, only the LPC Groups that are presented in that CPA will be cross-checked.

During the survey, the lamp type and the rated power of the surveyed lamps will be checked and matched against the lamp type and the rated power of the project lamps from the database. If the lamp type and the rated power of the surveyed lamp doesn't match with the lamp type and the rated power of the project lamp then the lamp will be counted as failed lamp and will not be considered for emissions reduction calculation. Note that the project lamps will be identified by their lamp type and rated power. If the lamps that replace the failed project lamps (eg. as part of an ongoing maintenance program) during the crediting period is of similar type and have similar rated power as the failed project lamps then those lamps will be considered as project lamps.

Table 6: PCCG Sample Size per CPA

LPC Group	Minimum number of lamps to be cross checked
Group I	271
Group II	271
Group III	271
Group IV	271
Group V	271
Group VI	271
Group VII	271
Group VIII	271

Verification of Sample Reliability

After PSG metering has been completed, the data will be used to calculate Mean, Standard Deviation, Maximum Value of Error, Coefficient of Variation (CV) of the collected data for each LPC group.

The following statistical equations will be applied for calculating and reporting the reliability of parameters estimated:

Maximum Value of Error:

$$E = t_{n-1}\frac{SD}{\sqrt{n}}$$ (Equation 3)

Where,

E = Maximum Value of Error
SD = Standard Deviation of the Sample
n = Sample Size
t_{n-1}= The t- value

Coefficient of Variation:

$$CV = \frac{SD}{\bar{x}}$$ (Equation 4)

Where,

CV = Coefficient of Variation
SD = The Standard Deviation of the Sample
$\bar{x}$ = The Sample Mean

Precision:

$$P = \frac{E}{\bar{x}}$$ (Equation 5)

Where,

P = Precision
E = Maximum Error
$\bar{x}$ = The sample mean

Using the above stated equations, Maximum Error and Confidence interval (Precision) at the required confidence level of 95% is estimated. The confidence interval is then either accepted or, if it is too large, additional sampling may be required.

The CME may choose to increase or decrease the sample size of the LPC groups in the subsequent monitoring period to meet the required precision.

The following example outlines the procedure to increase or decrease the sample size. Note that the stipulated numbers in the table are for illustrative purposes only and the above-mentioned statistical equations have been applied to estimate the reliability requirement.

Example 1: Reliability requirement verification procedure

LPC Group	Population (N)	Sample Size (n*+10%)	Number of Samples Metered	Measured Annual Operating Hours	SD	Maximum Error (E)	Actual Precision at 90% confidence	Reliability Requirement met?
Group I	660	107	107	600	175	33.2	5.54%	Yes
Group II	800	107	107	1700	850	161.46	9.50%	Yes
Group III	900	107	107	3000	2600	493.87	16.46%	No
Group IV	700	107	107	3700	1200	227.94	6.16%	Yes
Group V	600	107	107	4800	2200	417.89	8.71%	Yes
Group VI	950	107	107	5700	2222	422.06	7.40%	Yes
Group VII	850	107	107	7000	3200	607.83	8.68%	Yes
Group VIII	750	107	107	8300	4213	800.25	9.64%	Yes

As shown in the example table above, the reliability requirement for Group III is not met. In such circumstances the CME may choose to increase the sample size for the subsequent monitoring periods to meet the reliability requirement by revising the original sample size as shown in the example table below. In order to revise the sample size, the actual CV will be calculated by using the metered data. These CV values will be used in Equation 1 and Equation 2 to calculate a revised total sample size and allocation across each LPC groups.

Example 2: Revised sample size estimation procedure

LPC Group	N	Original Sample	Measured Annual Operating Hours	Actual CV	New Sample Size	New Sample Size (n*+10%)	Remarks
Group I	660	107	600	0.29	33	37	The CME may choose to reduce the sample size to 37 or may continue to monitor original sample size of 107
Group II	800	107	1700	0.50	97	107	The CME may continue monitoring original sample size of 107
Group III	900	107	3000	0.87	291	321	The CME may increase the sample size to 321
Group IV	700	107	3700	0.32	40	44	The CME may choose to reduce the sample size to 44 or may continue to monitor original sample size of 107
Group V	600	107	4800	0.46	82	91	The CME may choose to reduce the sample size to 91 or may continue to monitor original sample size of 107
Group VI	950	107	5700	0.39	59	65	The CME may choose to reduce the sample size to 65 or may continue to monitor

							original sample size of 107
Group VII	850	107	7000	0.46	82	91	The CME may choose to reduce the sample size to 91 or may continue to monitor original sample size of 107
Group VIII	750	107	8300	0.50	97	107	The CME will may continue monitoring original sample size of 107

Note that the CME may also choose to expand or decrease the number of LPC Groups in the subsequent monitoring period. This means that the CME may decide to increase the initial LPC Group classification to more than eight or decrease the initial LPC Group to less than eight.

Procedures for Administering Data Collection and Minimizing Non-Sampling Errors:
The CME will implement the data record keeping system as described in section A.4.4.1. The CME will outsource the monitoring and data collection to an experienced and qualified M & V expert and the CME will oversee the entire data collection and analysis process.

The data collection process is described below:
The baseline and project data are entered into a spreadsheet based database according to the their LPC Group classification. The database will estimate the weighted average power in Watts for both baseline and project lamps including ballasts at each LPC group. The difference in wattage between the baseline and project lamps including ballasts will be the average power saved by each LPC Group.

The next step is to multiply this difference in wattage with the yearly operating hours to calculate the yearly savings in power consumption and the resulting emission reductions at an individual LPC Group. The yearly operating hours are determined for each LPC Group by stratified random sampling, as described at length above.

Meter Failure:
Note that it is inevitable that at some times, some meters will fail. When this occurs, the CME will work to repair the meter. During the time that the meter is not working or under repair, data will not be available. In this case, only days for which there was metering data available will be included in the calculation of mean operating hours for each LPC for that monitoring period. This will then be averaged across LPCs belonging to the Group/s to get an overall average operating hours of the LPC Group/s.

Note that the meter failure can occur at any time during the monitoring period and the meter failure is unrelated to operating hours. Although ideally all of the monitoring days within the monitoring period will be used, in order to determine a lower limit of the number of acceptable days where monitoring data is available, a minimum sample size for the number of monitoring days required will be calculated.

Since this sample will be a large fraction of the total days measured, a finite population correction will be applied. The following formula will be used to calculate the minimum sample size for the number of acceptable days where monitoring data is available.

$$n_{days} > \frac{1}{(e^2/(Z^2 * CV^2)) + (1/N_{days})}$$

n_{days} = Sample size for the number of acceptable days where monitoring data is available

Z= Z- value, 1.96 for 95% confidence

e = Desired level of precision (i.e. 10%)

CV = Co-efficient Variation (taken as 0.50 to be more conservative)

N_{days}= Number of monitoring days
For instance, if N=365 days, the sample size (i.e. n_{days}) will be 77 days. This means that any LPC for which there are at least 77 days of annual measurements be included in the overall calculation and the LPCs for which metered data is available less than 77 days will be excluded from the overall calculation. Note that each LPC group is oversampled by 10%, therefore the CME could exclude number of samples that are equivalent to oversamples from each LPC Group that doesn't meet the acceptable number of days (i.e. n_{days}). For example, if a LPC Group has got 10 extra samples from oversampling, then the CME could exclude data from up to 10 meters that don't meet the acceptable number of days threshold (i.e. n_{days}).

The CME may only exclude meters from the sample group up to the 10% oversample level. If more meters than this fail to meet the minimum threshold number of sample days, they will be retained in the LPC PSG and their data will be used to determine the mean hours of use value. In this instance if the impact of low numbers of sample days results in a failure to meet the required precision level (10%), this will be reflected in the conservative treatment of mean values as stated above in the verification of sampling reliability section.

The length of monitoring period will be decided by the CME and it may be desirable to calculate n_{days} for different monitoring periods. In this instance, the above mentioned formula will be used, with N_{days} replaced by relevant number of days in the monitoring period. For instance, if the monitoring period was 183 days or 6 months, the minimum number of acceptable days would be 63 days.

Implementation
The CME will outsource the monitoring and data collection to an experienced and qualified M&V provider. This will rule out any conflict of interest of those involved in the data collection and analysis. The PSG and PCCG data collection will be done by the M&V provider. As the PoA will be implemented in different countries it may not be feasible for the M&V provider to directly check randomly selected lamps at each site. Therefore, the M&V provider will work with the building /facility manager of each selected site to complete this PCCG survey. The M&V provider will request the building/facility manager to check the functionality of the lamps by providing them the LPC number that is randomly generated by the system. The building /facility manager will report the functionality of the lamps to the M&V provider or the CME. The M&V provider or the CME will input the data into the system database. Similarly, the M&V provider will work with the building/facility manager to identify the sample LPCs

in the target building/s. To ensure that the right LPC samples are selected for installation of metering equipment and ongoing monitoring, the M&V provider may cross check the operating hours information of the sample LPCs with the building/facility manager.

The sampling and monitoring processes will be conducted at the PoA level for PSG. As additional CPAs are added to the PoA over time it is important to obtain a representative sample of all CPAs that are included into the PoA. To achieve this the samples are allocated proportionally across the CPAs. The following example illustrates how the sample size will be allocated to the CPAs that are added into the PoA over time.

Example 3:

LPC Group	CPA 1	
	Population Size (N_1)	PSG Sample Size (n_1)
Group I	1000	107
Group II	2000	107
Group III	1500	107
Group IV	2500	107
Group V	1000	107
Group VI	2000	107
Group VII	1000	107
Group VIII	2000	107

Second CPA comes online:

LPC Group	CPA 1		CPA 2	
	Population Size (N_1)	PSG Sample Size (n_1)	Population Size (N_2)	PSG Sample Size (n_2)
Group I	1000	107	600	?
Group II	2000	107	700	?
Group III	1500	107	800	?
Group IV	2500	107	900	?
Group V	1000	107	650	?
Group VI	2000	107	750	?
Group VII	1000	107	950	?
Group VIII	2000	107	650	?

Distribution of samples across CPA 1 and CPA 2

LPC Group	CPA 1+CPA 2		CPA1	CPA2
	Population Size ($N_1 + N_2$)	Required sample size (SS)	PSG Sample Size (n_1)	PSG Sample Size (n_2)
Group I	1600	107	67	40

Group II	2700	107	79	28
Group III	2300	107	70	37
Group IV	3400	107	79	28
Group V	1650	107	65	42
Group VI	2750	107	78	29
Group VII	1950	107	55	52
Group VIII	2650	107	81	26

Where, n_1= SS *(N_1/N_1+N_2) and n_2= SS *(N_2/N_1+N_2).

In the above example, for LPC Group 1, the CME will install 40 meters at CPA 2 sites. The sample at CPA 2 site will be randomly selected. The CME may choose to uninstall 40 meters (i.e.107-67=40) from CPA 1 and install those meters at the randomly selected samples at CPA 2. The CME may also choose to let all the 107 meters continue running at CPA 1 or switch off 40 meters or may choose to install 40 new meters at CPA 2 sites. The CME will decide which option to choose based on the site-specific conditions. The meters that are going to be uninstalled or switched off at CPA 1 site will be selected randomly.

The remaining LPC Groups will also follow the same approach as described above for LPC Group I. This process will guarantee a uniform distribution of the monitoring samples throughout the PoA.

Calculation of average operating hours at the PoA level having CPAs with different start dates:

Different CPAs will have different start dates, as CPAs will be added onto the PoA at different times. In relation to issuance of CERs for the CPAs, Paragraph 37 of the “Procedures for Registration of a Programme of Activities as a Single Project Activities and Issuance of Certified Emission Reduction for a Programme of Activities” (Version 04.1) entails to request the issuance of CERs for all CPAs included in the PoA during the specified monitoring period. This means that all CPAs that are included in the PoA need to request for issuance of CERs at the same time during the crediting period period.

Since the sample size for PSG will be determined at the PoA level and the CPAs will be added onto the PoA at different times, the value for average operating hour at the PoA level for the specified monitoring period will be calculated by taking a simple average of operating hours data of all CPAs included within the PoA.

Example 4 illustrates one way of calculating the average operating hours at the PoA level.

Example 4: *Calculation of average operating hours at the PoA level having CPAs with different start dates*

Let’s assume that there are 3 CPAs included onto the PoA at different time periods as shown in the table below. Month (M) denotes time period and MAOH is Monthly Average Operating Hour.

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13
CPA 1 inclusion													Verification of all CPAs commences
CPA 2 inclusion													
CPA 3 inclusion													

In this example, the monitoring period for CPA 1, CPA 2 and CPA 3 are 12 months, 9 months and 6 months respectively. X, Y and Z denote the metered monthly average operation hour value for CPA 1, CPA 2 and CPA 3 respectively.

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
CPA 1 (MAOH)	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}
CPA 2 (MAOH)				Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9
CPA 3 (MAOH)							Z_1	Z_2	Z_3	Z_4	Z_5	Z_6

The CME may apply the following formula or any other formula deemed appropriate to calculate the Average Operating Hours value for a LPC Group at the PoA level.

Average Operating Hours of a LPC Group at the PoA level = (Average Operating Hour of the LPC Group in CPA1+ Average Operating Hour of the LPC Group in CPA2+ Average Operating Hour of the LPC Group in CPA3)/3

Where,

Average Operating Hour of the LPC Group in CPA1 = Average of X1 to X12
Average Operating Hour of the LPC Group in CPA2 = Average of Y1 to Y9
Average Operating Hour of the LPC Group in CPA3 = Average of Z1 to Z6

Note that the aforementioned formula is to illustrate one way of calculating the average operating hour value for the LPC Group/s at the PoA level with CPAs having different start dates. The CME may choose to apply any other method or formula to estimate the average operating hour value at the PoA level.

Monitoring Period:
The length of each monitoring period will be decided by the CME, with surveys of crosscheck lamps to occur periodically or at least annually.

Quality Assurance & Quality Control
The CME will implement the data record keeping system as described in section E.7.2 of the SSC-PoA-DD. In order to achieve good quality data, the CME will outsource the monitoring and data collection to an experienced and qualified third party. This will also rule out any conflict of interest of those involved in the data collection and analysis. The CME will oversee the entire data collection and analysis process.

Analysis
The collected data on mean value of LPC Group operating hours data and the proportion of operating

lamps in each LPC Group data will be used to calculate emission reductions for that portion of the crediting period.

The PSG will be monitored to obtain the mean value of operating hours. The mean value of the operating hours of each LPC Group in the PSG will be directly extrapolated to each of the respective LPC Groups involved in the PoA.

The proportion of operating lamps for each CPA will be surveyed at least annually. The results obtained from the PCCG survey will be extrapolated to all LPC Groups involved in that CPA.

Monitoring Equipment
The monitoring equipment will record the operating hours of LPC Groups belonging to the PSG. Monitoring equipment will be spot checked to ensure ongoing functionality and accurate calibration. If irregularities are recorded with equipment, this will be flagged immediately by the monitoring system and corrective actions will be implemented to repair or re-calibrate metering equipment. Calibration of the equipment will be conducted by the CME at least once in three years or as required.

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

>>No public funding will be used for the PoA

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

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

>> **19/07/2011**
The starting date of the PoA corresponds to the date on which the PDDs were uploaded at the commencement of the Global Stakeholder Consultation.

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

28 years

SECTION C. Environmental Analysis

>>

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

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

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

>>The PoA involves the distribution and installation of lighting equipment in the participating countries. Any lighting equipment distributed under the PoA will have the Conformance Mark (CE) by which the technology suppliers declare that the products meet EU and African safety, health and environmental requirements and are RoHS compliant. Furthermore the use of lighting equipment does not entail

significant environmental impacts.

There are no statutory environmental requirements on lighting equipment disposal. The primary environmental impact of the PoA is the physical waste created by the replaced lighting equipment. The methodology requires that this is collected and scrapped to prevent leakage. In many instances, base materials of old equipment (e.g. glass and metals from light bulbs) can be recycled. Where possible, the CME will work with local businesses to implement a recycling strategy. The mercury from the CFLs and tubular fluorescent lamps collected will be treated as hazardous waste and stored and processed accordingly.

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),:

>> None of the Host Parties included in the PoA require an EIA to be undertaken for a typical CPA.

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 **X**

A stakeholder consultation process will be undertaken for each CPA included in the PoA. The results of each process will be documented in the CPA-DD.

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

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

>>

D.3. Summary of the comments received:

>>

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

>>

SECTION E. Application of a baseline and monitoring methodology

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

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

>>

The PoA will use the following approved small-scale methodology:
AMS-II.C. Demand-side energy efficiency activities for specific technologies – Version 13
Note that the methodology has been approved for use in a PoA by the Executive Board.

In addition, the PoA will utilise the following Tools and Guides:

Tool to calculate the emissions factor for an electricity system – Version 2.2.1

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

>>

Applicability of AMS-II.C. Demand-side energy efficiency activities for specific technologies – Version 13

AMS.II.C requirements	**Qualification / Justification**
This methodology comprises activities that encourage the adoption of energy-efficient equipment/appliance (e.g., lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems) at many sites. These technologies may replace existing equipment or be installed at new sites. In the case of new facilities, the determination of baseline scenario shall be as per the procedures described in the general guidance to SSC methodologies under the section 'Type II and III Greenfield projects (new facilities)'.	The methodology is applicable to SSC-CPAs under the proposed PoA because these projects concern the installation of energy efficient lighting equipment in commercial buildings, creating demand-side energy savings and reductions in greenhouse gas emissions.
The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year for electrical end use energy efficiency technologies.	As per the eligibility criteria stipulated in Section A.4.2.2 the CME will design each SSC-CPA such that aggregate annual energy savings should not exceed 60GWh per year.
For each replaced appliance/equipment/system the rated capacity or output or level of service (e.g., light output, water output, room temperature and comfort, the rated output capacity of air-conditioners etc.) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.	As per the eligibility criteria stipulated in Section A.4.2.2 technologies installed under each SSC-CPA will meet the required standards for lumen or lux output and/or service levels compared to the baseline. Specifically, lumen or lux output for the project activity lighting systems will provide no more than 50% greater and no less than 10% fewer lumens or lux that the baseline lighting system replaced. In instances where the lighting output or service levels of a project retrofit are more than 10% lower than in the baseline, the CPA implementer must demonstrate to the CME that the lighting levels still satisfy relevant national standards for required lighting levels for their particular building type (eg. office, warehouse, retail shop etc).
In case the project activity involves the replacement of equipment, and the leakage effect	As per para 17 of the methodology, leakage associated with SSC-CPAs will be ignored, as

of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	allowed for by the methodology, through the independent verification of the scrapping of baseline lighting equipment.

NOTE: In the case of CPAs which individually do not exceed the SSC threshold, SSC methodologies may be used once they have first been reviewed and, as needed, revised to account for leakage in the context of a SSC-CPA.

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

>>The project boundary is the physical, geographical location of each measure (each piece of equipment) installed.

	Source	Gas	Included?	Justification
Baseline	Power plants servicing the electricity grid	CO_2	Yes	Main source
		CH_4	No	Minor Source
		N_2O	No	Minor Source
Project Activity	Power plants servicing the electricity grid	CO_2	Yes	Main source
		CH_4	No	Minor Source
		N_2O	No	Minor Source

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

>>AMS IIC version 13 states that if the energy displaced is fossil fuel based, the energy baseline is the existing level of fuel consumption or the amount of fuel that would be used by the technology that would have been implemented otherwise. The emissions baseline is the energy baseline multiplied by an emission factor for the fossil fuel displaced.

In order to determine realistic alternative scenarios to the proposed PoA, the project proponents have undertaken an assessment of relevant national and/or sectoral policies and circumstances of each of the Host countries involved in the PoA. This review has determined that there is great need for energy efficiency in all countries covered by the PoA, and national governments and utilities have sought to establish a range of targets, policies and measures to facilitate the introduction of more efficient approaches to the consumption of energy. The national and sectoral policies of each of the host countries are listed in section A.4.1.2 of the PoA-DD.

Four alternative baseline scenarios to the proposed PoA are possible:

Number & name of baseline scenario	Description
1. Business-as-usual	Continued use of existing lighting technologies by commercial building owners and occupiers.
2. Autonomous replacement	The proposed activity is undertaken without being registered as a CDM project activity. Under this scenario building owners and occupiers would choose to retrofit and refurbish their existing lighting systems with new energy efficient technologies on a scale comparable to that envisaged by the proposed PoA.
3. Mandatory replacement	The future introduction of laws stipulating the improved energy efficiency of commercial building lighting systems leading to the large scale uptake of efficient lighting technologies.
4. Alternative incentives	The introduction of alternative energy saving regulations or policies, such as a demand side management scheme, that create an incentive in the absence of the CDM to improve the energy efficiency of commercial lighting systems. Such incentives would need to cause the uptake of energy efficient lighting technologies on a scale comparable to that envisaged by the proposed PoA.

Based on the above analysis there are two realistic baseline scenarios to the proposed activity – either 1. the continuation of business-as-usual or, 2. the autonomous uptake of more energy efficient lighting systems in commercial buildings.

The project proponents have argued that the most likely scenario in the absence of the PoA is the continuation of business-as-usual. Under this scenario commercial building owners and occupiers will continue to utilise existing, low efficiency lighting systems which offer the perceived advantages of being lower cost and lower risk. As the PoA is not applied Greenfield developments the project proponents have not provided an assessment of the baseline scenario for new facilities.

The baseline emissions of each SSC-CPA will be measured by gathering data during the baseline survey audit by recording the power rating of each device to be replaced by the SSC-CPA.

The project proponents have selected Option 1 of AMS IIC (paragraph 6) to determine baseline emissions. Because the energy displaced is electricity, the emission baseline is determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

$$BE_y = E_{BL,y} * EF_{CO2,\ ELEC,y} \qquad (1)$$

Where:

BE_y Baseline emissions in monitoring period y (tCO_2e)
$EF_{CO2,ELEC,y}$ Emission factor in monitoring period y calculated in accordance with the provisions in AMS I.D (tCO_2/MWh)

The SSC-CPAs will follow equation 2 below in order to calculate the baseline emissions, where the number (n_i) and power (p_i) of baseline lighting equipment will be collected during the baseline building

audit. Monitoring of the hours of use (o_i) will be conducted through the ongoing metering of a representative sample of LPC Groups with the average daily usage value applied to the baseline scenario to determine emissions.

$$E_{BL,y} = \Sigma_i(n_i * p_i * o_i)/(1-l_y) \quad (2)$$

Where:

$E_{BL,y}$	Energy consumption in the baseline in monitoring period *y* (kWh)
Σ_i	Sum over the group of "i" devices (e.g. 40W incandescent bulb) replaced, for which the substituted energy efficient equipment operating during the monitoring period, implemented as part of the project.
n_i	Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced for which the substituted energy efficient equipment is operating during the monitoring period.
p_i	Power of the devices of the group of "i" devices (e.g. 40W incandescent bulb, 5hp motor) replaced. In the case of a retrofit activity, "power" is the weighted average of the devices replaced.
o_i	Average operating hours during the monitoring period of the devices of the group of "i" devices replaced.
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

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:

>> As per EB47 paragraph 73 "Additionality is to be demonstrated either at a PoA level of at a CPA level". The project proponents have chosen to demonstrate additionality at CPA level.

EB 60, Annex 26 paragraph 4 states: "The Board clarified that a full additionality assessment is not required in the context of component project activities (CPA), rather the confirmation of additionality for CPAs should be conducted by means of the eligibility criteria."

To demonstrate the additionality of a typical SSC-CPA, the SSC-CPA implementer and CME will provide a discussion of one or more of the barriers listed below, as per the guidance provided in Attachment A to Appendix B of 4/CMP.1 Annex II. and the "Non-binding best practice examples to demonstrate additionality for SSC project activities" in Annex 34, EB35. SSC-CPAs may also choose to

compliment their discussion of barriers with an investment analysis as per paragraph 7 of the "Guidelines for objective demonstration and assessment of barriers" Version 01.

In summary, it is expected that SSC-CPAs will encounter one or more of the following barriers:

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

Undertaking a whole-of-building retrofit represents a considerable up front investment when compared to the progressive maintenance and replacement of existing lights over time. Each SSC-CPA under the PoA will require that a large number of functional lamps be replaced before the end of their useful lifetimes to avoid additional electricity consumption and emissions. If choosing to demonstrate the presence of this barrier, the CPA Implementer shall show that the business-as-usual approach does not require a capital intensive refurbishment of lighting systems, but rather only ongoing periodic replacement of failed baseline lamps.

Access-to-finance barrier: the project activity could not access appropriate capital without consideration of the CDM revenues;

If choosing to demonstrate the presence of this barrier, SSC-CPAs can provide an analysis of the project costs and the lack of available capital to implement the proposed measures. This analysis should include the nature of the company or organisation implementing the project, its ownership and financial information. The project proponents, building owners or occupiers may present evidence that CDM revenues are critical to gaining access to capital in order to implement the SSC-CPA.

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

Many of the energy efficient lighting technologies offered under SSC-CPAs are relatively new, with a low level of awareness amongst consumers and building managers, and even lower levels of operating experience. The innovative nature of some of the lighting technologies, combined with their higher cost, as well as the capital intensive nature of a whole-of-building lighting retrofit combine to create strong preferences for continued utilization of existing lighting systems and technologies. International studies[30] show that uncertainty regarding realisable cost savings, and therefore return on investment, is a major reason for companies avoiding investment in energy efficiency.

If choosing to demonstrate the presence of this barrier, SSC-CPAs should demonstrate that the energy efficient lighting technologies to be installed have a low market share (excluding from consideration the proportion of those technologies distributed as part of SSC-CPAs under the PoA or other CDM projects), or that the building owner or manager has never utilised the proposed lighting equipment previously, and as such face barriers because of perceived performance risks.

[30] See for example, Clinton Climate Initiative, 2009. "An Introduction to Energy Performance Contracting"; International Energy Agency/OECD, 2007. "Mind the Gap: Quantifying Principal-Agent Problems in Energy Efficiency". In support of the G8 Plan of Action. Paris.

Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

Building owners, occupiers and facility maintenance personnel may have a limited understanding of the benefits of energy savings on lowering whole-of-life lighting costs, and as such continue to purchase and use existing, comparatively inefficient lighting technology which is perceived as being cheaper, familiar and risk free. The challenge of monitoring and quantifying realized cost savings (electricity and lamp replacement) for individual building owners, occupiers or facilities managers, and the potential risk of poor technology performance mean that the ongoing use of baseline lighting technologies is highly likely.

If choosing to demonstrate the presence of this barrier, SSC-CPAs should demonstrate that building owners and occupiers intend to continue to utilise their existing lighting equipment, and that without access to the services and revenues provided through the PoA, do not intend to implement a retrofit or refurbishment of their lighting systems to improve energy efficiency.

Other barriers: such as institutional barriers or limited information, managerial resources, organizational capacity, or capacity to absorb new technologies.

If choosing to demonstrate the presence of alternative barriers, SSC-CPAs may choose to identify and discuss barriers such as institutional, information, managerial, or organisational capacity in order to demonstrate the additionality of the project activity.

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

>>
Based on the above analysis and the information provided in section A.4.3. a SSC-CPA is considered additional if it demonstrates the presence of one or more of the barriers listed in section E.5.1 of the PoA-DD.

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:

>>The following are the methodological choices provided for in AMS IIC v13 which will be applied in relation to each of the SSC-CPAs to be developed under this PoA.

Determination of Baseline Emissions
The energy displaced through a SSC-CPA is electricity, and the project proponents have chosen to use Option 1 (para 6) of the methodology to determine baseline emissions. Baseline emissions are determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced. The grid emission factor for the electricity displaced is determined in accordance with the applied baseline and monitoring methodology. The baseline emissions are adjusted for average technical grid losses (transmission and distribution) during the monitoring period for the grid serving the location where the lighting equipment is to be installed.

Determination of Project Emissions
The energy consumed in the project is electricity, therefore, project emissions are determined by multiplying electricity consumption in the project with the grid emission factor for electricity to determine project emissions. The grid emission factor for electricity is determined in accordance with the

applied baseline and monitoring methodology. The project emissions are adjusted for average technical grid losses (transmission and distribution) during the monitoring period for the grid serving the location where the lighting equipment is installed.

Leakage
Leakage will be neglected because the replaced equipment will be scrapped and independent monitoring of the scrapping of replaced equipment will be implemented in compliance with the requirements of the applied baseline and monitoring methodology.

Calculation of Emission Reductions
Emission Reductions are calculated by subtracting project emissions from baseline emissions.

Monitoring

The monitoring approach described in paragraphs 13 and 14 in the methodology will be utilised by the SSC-CPAs.

13. If the devices installed have a constant current (ampere) characteristics, monitoring shall consist of monitoring either the “power” and “operating hours” or the “energy use” of the devices installed using an appropriate method. Appropriate methods include:

(a) Recording the “power” of the device installed (e.g., lamp or refrigerator) using nameplate data or bench tests of a sample of the units installed and metering a sample of the units installed for their operating hours using run time meters;

OR

(b) Metering the “energy use” of an appropriate sample of the devices installed.

14. In either case, monitoring shall include annual checks of a sample of non-metered systems to ensure that they are still operating.

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

>>

Calculation of Baseline Emissions

The project proponents have selected Option 1 (paragraph 6) to determine baseline emissions. Because the energy displaced is electricity, the emissions baseline is determined as the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

$$BE_y = E_{BL,y} * EF_{CO2,\ ELEC,y} \quad (1)$$

Where:

BE_y Baseline emissions in monitoring period *y* (tCO_2e)

$EF_{CO2,ELEC,y}$ Emission factor in monitoring period *y* calculated in accordance with the provisions in AMS I.D (tCO_2/MWh)

The calculation of baseline emissions will follow Equation 2 below,where the number (n_i) and power (p_i) of baseline lighting equipment will be collected during the baseline building audit. Monitoring of the hours of use (o_i) will be conducted through the ongoing metering of a representative sample of project LPCs with the average daily usage value applied to the baseline scenario to determine emissions.

$$E_{BL,y} = \Sigma_i(n_i * p_i * o_i)/(1-l_y) \quad (2)$$

Where:

$E_{BL,y}$	Energy consumption in the baseline in monitoring period *y* (kWh)
Σ_i	Sum over the group of "i" devices (e.g. 40W incandescent bulb, 5hp motor) replaced, for which the substituted energy efficient equipment operating during the monitoring period, implemented as part of the project.
n_i	Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced for which the substituted energy efficient equipment is operating during the monitoring period.
p_i	Power of the devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced. In the case of a retrofit activity, "power" is the weighted average of the devices replaced.
o_i	Average operating hours during the monitoring period of the devices of the group of "i" devices replaced.
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

Note that $E_{BL,y}$ will be calculated for each LPC Group separately and then summed to determine the total baselne emissions.

Calculation of Project Emissions

Project emissions consist of electricity used in the project equipment, determined as follows.

$$PE_y = E_{PJ,y} * EF_{CO2,y} \quad (3)$$

Where:

PE_y	Project emissions in year *y* (tCO2e)
$E_{PJ,y}$	Energy consumption in project activity in year *y*. This shall be determined *ex post* based on monitored values
$EF_{CO2,y}$	Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain

Project energy consumption in case of project activities that displace grid electricity is determined as follows using the data of the project equipment or system:

$$E_{PJ,y} = \Sigma_k(n_k * p_k * o_k)/(1-l_y) \qquad (4)$$

Where:

Σ_k	Sum over the group of "k" energy efficient devices installed that are operating during the monitoring period of the project.
n_k	Number of energy efficient devices "k" installed that are operating during the monitoring period of the project.
p_k	Power of energy efficient devices "k" installed that are operating during the monitoring period of the project. In the case of a retrofit activity, "power" is the weighted average of the devices installed.
o_k	Average operating hours during the monitoring period of the energy efficient devices of the group of "k".

Note that $E_{PJ,y}$ will be calculated for each LPC Group separately and then summed to determine the total project emissions.

Calculation of Emission Reductions

$$ER_y = (BE_y - PE_y) - LE_y \qquad (5)$$

Where:

ER_y	Emission reductions in year *y* (tCO2e)
LE_y	Leakage emissions in year *y* (tCO2e)

Note that ER_y will be calculated for each LPC Group separately and then summed to determine the total emission reductions. Note also that leakage (LE_y) can be ignored as allowed under para 17 of AMS IIC as each CPA will ensure that independent monitoring of scrapping of replaced equipment is implemented.

Grid Emission Factor

The equations and methodology used for the calculation of grid emission factors in the countries covered by the PoA will be provided in the specific CPA-DD for each project activity.

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

(Copy this table for each data and parameter)

Data / Parameter:	**EF**
Data unit:	$kgCO_2/kWh$
Description:	Emissions factor for electricity displaced from the grid relevant to the project boundary.

Source of data used:	Relevant sources will be provided in the CPA-DD. This value can be determined from recent data published either by a national utility or an official governmental body.
Value applied:	Specified in the CPA-DD
Justification of the choice of data or description of measurement methods and procedures actually applied :	Justification of data used will be provided in the CPA-DD
Any comment:	EF will be revised at the point of renewal of the crediting period of the PoA.

Data / Parameter:	$\mathbf{l_y}$
Data unit:	%
Description:	Average technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed.
Source of data used:	Relevant sources will be provided in the CPA-DD.
Value applied:	Specified in the CPA-DD
Justification of the choice of data or description of measurement methods and procedures actually applied :	The methodology requires that the average technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. In the absence of such data, a default value of 10% may be applied.
Any comment:	l_y will be revised at the point of renewal of the crediting period of the PoA.

Data / Parameter:	$\mathbf{n_{PSG}}$
Data unit:	Number
Description:	The CME will identify and document the sample size used for monitoring utilisation hours in the Project Sample Group
Source of data used:	Determined by project participants with reference to the "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities" (Annex2, EB 65).
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Project Sample Group will include enough metered LPCs to ensure representative data is captured in order to determine an average hours of utilisation and for the project devices. This sample size will enable a robust assessment of key parameters for the determination of emission reductions. The PSG will be calculated with reference to all CPAs rather than on a per-CPA basis so as to create the most efficient sampling regime possible for the PoA as a whole.
Any comment:	

Data / Parameter:	$\mathbf{n_{PCCG}}$
Data unit:	Number
Description:	The CME will identify and document a sample size of non-metered LPCs which will be subject to annual checks to measure the proportion of project

	lighting systems installed that are still operating.
Source of data used:	Determined by project participants with reference to the "Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities" (Annex2, EB 65).
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Project Sample Group will include enough metered LPCs to ensure representative data is captured in order to determine an average hours of utilisation for the project devices. This sample size will enable a robust assessment of key parameters for the determination of emission reductions. The PCCG will be calculated with reference to all CPAs rather than on a per-CPA basis so as to create the most efficient sampling regime possible for the PoA as a whole.
Any comment:	-

Data / Parameter:	$\mathbf{n_{i,\ Group}}$
Data unit:	Number
Description:	Number of devices of the group of "i" devices (e.g. 40W incandescent bulb) replaced, belonging to each LPC Group as per the monitoring plan, for which the substituted energy efficient equipment is operating during the monitoring period.
Source of data used:	SSC-CPA implementer
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	During the baseline audit of participating buildings, the SSC-CPA implementer will record the number of lighting devices to be replaced as part of the retrofit activity. This information will be confirmed during the lighting equipment installation process during which time a record will be kept of the number of pieces of lighting equipment replaced. This information will be stored in the project data management system (DMS). Each employee involved in the project will be trained in the use of the DMS to ensure accurate record keeping. The DMS will use industry standard software, databases, infrastructure and back-up procedures to allow full auditability with the aim of ensuring long-term data integrity and security so that data is not misrecorded, overwritten or lost. Data is verified in a timely manner at point of data entry to ensure valid and non-duplicate customer/building information, and an accurate number of lamps and equipment replaced is recorded. As per AMS.II.C. an independent auditor will be required to verify the collection and subsequent destruction of replaced equipment.
Any comment:	All data will be stored in the project database for at least two years after the crediting period or the last issuance of CERs, for this programme, whichever occurs later.

Data / Parameter:	$\mathbf{n_{k,\ Group}}$
Data unit:	Number
Description:	Number of energy efficient devices "k" installed that are operating during the

	monitoring period of the project, belonging to each LPC Group as per the monitoring plan.
Source of data used:	SSC-CPA implementer
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA implementer will record the number of energy efficient lighting devices installed as part of the retrofit activity. This information will be stored in the project data management system (DMS). Each employee involved in the project will be trained in the use of the DMS to ensure accurate record keeping. The DMS will use industry standard software, databases, infrastructure and back-up procedures to allow full auditability with the aim of ensuring long-term data integrity and security so that data is not misrecorded, overwritten or lost. Data is verified in a timely manner at point of data entry to ensure valid and non-duplicate customer/building information, and an accurate number of lamps and equipment installed is recorded. The ongoing monitoring of the PCCG, described in E.7.1 below, will provide the survey data required to determine the proportion of lighting equipment installed that is operational during each monitoring period. The data collected through the PCCG surveys will be used to determine the value of n_k for each monitoring period.
Any comment:	All data will be stored in the project database for at least two years after the crediting period or the last issuance of CERs, for this programme, whichever occurs later.

Data / Parameter:	$p_{i, Group}$
Data unit:	Watts
Description:	The power of the lighting equipment "i" replaced belonging to each LPC Group as per the monitoring plan. In the case of a retrofit programme, p_i is the weighted average of the devices replaced.
Source of data used:	SSC-CPA implementer
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	During the baseline audit of participating buildings, the SSC-CPA implementer will record the wattage of lighting devices to be replaced as part of the retrofit activity. This information will be confirmed during the lighting equipment installation process during which time a record will be kept of the wattage of pieces of lighting equipment replaced. This information will be stored in the project data management system (DMS). Each employee involved in the project will be trained in the use of the DMS to ensure accurate record keeping. The DMS will use industry standard software, databases, infrastructure and back-up procedures to allow full auditability with the aim of ensuring long-term data integrity and security so that data is not misrecorded, overwritten or lost. Data is verified in a timely manner at point of data entry to ensure valid and non-duplicate customer/building information, and an accurate number of lamps and equipment replaced is recorded.
Any comment:	All data will be stored in the project database for at least two years after the

	crediting period or the last issuance of CERs, for this programme, whichever occurs later.

Data / Parameter:	$\mathbf{p}_{k,\ Group}$
Data unit:	Watts
Description:	Power of energy efficient devices "k" installed that are operating during the monitoring period of the project, belonging to each LPC Group as per the monitoring plan. In the case of a retrofit activity, "power" is the weighted average of the devices installed.
Source of data used:	SSC-CPA implementer
Value applied:	To be determined for each SSC-CPA
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA implementer will record the wattage of energy efficient lighting devices installed as part of the retrofit activity. This information will be stored in the project data management system (DMS). Each employee involved in the project will be trained in the use of the DMS to ensure accurate record keeping. The DMS will use industry standard software, databases, infrastructure and back-up procedures to allow full auditability with the aim of ensuring long-term data integrity and security so that data is not misrecorded, overwritten or lost. Data is verified in a timely manner at point of data entry to ensure valid and non-duplicate customer/building information, and accurate lamp and equipment wattage is recorded.
Any comment:	All data will be stored in the project database for at least two years after the crediting period or the last issuance of CERs, for this programme, whichever occurs later.

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:	$\mathbf{o}_{k,\ Group}$
Data unit:	Hours
Description:	Average operating hours during the monitoring period of the energy efficient devices of the group of "k" belonging to each LPC Group as per the monitoring plan.
Source of data to be used:	Periodic readings of monitoring equipment
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Product type dependent
Description of measurement methods and procedures to be applied:	Electronic metering equipment installed in the Project Sample Group. This equipment will feed monitoring information back to a centralised database.
QA/QC procedures to be applied:	Monitoring equipment will be spot checked to ensure ongoing functionality and accurate calibration. The metering equipment may be web or GSM enabled

	allowing real-time collation of data. If irregularities are recorded with equipment or data, this will be registered immediately and corrective actions implemented to repair or re-calibrate metering equipment. If the internet or telecommunication connection fails during monitoring, data can be retrieved manually from meters.
Any comment:	All data will be stored in the project DMS for at least two years after the crediting period or the last issuance of CERs, for this programme, whichever occurs later.

Data / Parameter:	**P_k**
Data unit:	%
Description:	Proportion of energy efficient devices “k” installed that are operating during the monitoring period of the project, belonging to each LPC Group determined through surveying the PCCG as per the monitoring plan.
Source of data to be used:	Periodic surveys of the PCCG
Value of data applied for the purpose of calculating expected emission reductions in section B.5	98%
Description of measurement methods and procedures to be applied:	The ongoing monitoring of the PCCG will provide the survey data required to determine the proportion (P_k) of lighting equipment installed that is operational during each monitoring period. The data collected through the PCCG surveys will be used to determine the proportion of n_k devices operating for each monitoring period.
QA/QC procedures to be applied:	In order to achieve good quality data, the CME will outsource the data collection to an experienced and qualified third party. This will also rule out any conflict of interest of those involved in the data collection and analysis. The CME will oversee the entire data collection and analysis process.
Any comment:	All data will be stored in the project DMS for at least two years after the crediting period or the last issuance of CERs, for this programme, whichever occurs later.

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

>>A detailed description of the monitoring plan of the PoA is provided in section A.4.4.2.

For the Standard Bank Energy Efficient Commercial Lighting Programme of Activities representative samples of the Last Point of Control (LPC) will be monitored at the PoA level.

The sampling approach consists of grouping the population of LPCs into “usage groups” from which samples are drawn. Usage groups are subsets of the entire population of LPCs that fall within certain average operating hours groups as shown in the Table 4 in section A.4.4.2 This grouping technique subdivides a large, heterogeneous population into smaller groups that are more homogeneous. The LPCs

will be initially classified into 8 groups as shown in the Table 4 in section A.4.4.2 above. Based on the monitoring results obtained the CME may choose to increase or decrease the number of LPC Groups or reclassify LPC Groups in subsequent monitoring periods. If there is any reclassification it is to ensure that the sample is the best representation of the population as a whole whilst minimising redundant metering.

In order to estimate ex-ante energy savings and emission reductions for each CPA, the CME will initially classify each LPC into the groups by estimating its average operating hours per day. The CME will obtain the required estimation of operating hours by any of the following methods:

(a) The building operator's knowledge of average operating hours of LPCs; or
(b) Prior study on average operating hours of the LPCs; or
(c) Metering a randomly selected sample of LPCs to obtain the average operating hours; or
(d) Recording the daily operating hour data of the LPCs for a certain period of time.

The operating hour data of a representative sample of LPCs across each LPC group will be monitored for the duration of the crediting period as stated in section A.4.4.2 above. The failure rate of a representative sample of lighting technology under each LPC group will also be surveyed periodically as stated in section A.4.4.2. The LPCs in the sampling group, also known as the Project Sample Group (PSG), will be equipped with monitoring meters that measure the number of operating hours. The data collected from these monitoring meters will be extrapolated to the respective LPC groups. Similarly, the results obtained from the periodic survey of the failure rate of the lamps in the Project Cross Check Group (PCCG) will be extrapolated to the relevant LPC groups.

The PSG and PCCG sample size estimation method is described in Section A.4.2.2 above. The sampling and monitoring processes will be conducted at the PoA level. As additional CPAs are added to the PoA over time, the samples will be allocated proportionally across the CPAs. The following example illustrates how the sample size will be allocated to the CPAs that are added into the PoA over time.

Example:

First CPA in operation:

LPC Group	CPA 1	
	Population Size (N_1)	PSG Sample Size (n_1)
Group I	1000	107
Group II	2000	107
Group III	1500	107
Group IV	2500	107
Group V	1000	107
Group VI	2000	107
Group VII	1000	107
Group VIII	2000	107

Second CPA comes online:

LPC Group	CPA 1		CPA 2	
	Population Size (N_1)	PSG Sample Size (n_1)	Population Size (N_2)	PSG Sample Size (n_2)
Group I	1000	107	600	?
Group II	2000	107	700	?
Group III	1500	107	800	?
Group IV	2500	107	900	?
Group V	1000	107	650	?
Group VI	2000	107	750	?
Group VII	1000	107	950	?
Group VIII	2000	107	650	?

Distribution of samples across CPA 1 and CPA 2

LPC Group	CPA 1+CPA 2		CPA1	CPA2
	Population Size ($N_1 + N_2$)	Required sample size (SS)	PSG Sample Size (n_1)	PSG Sample Size (n_2)
Group I	1600	107	67	40
Group II	2700	107	79	28
Group III	2300	107	70	37
Group IV	3400	107	79	28
Group V	1650	107	65	42
Group VI	2750	107	78	29
Group VII	1950	107	55	52
Group VIII	2650	107	81	26

Where, $n_1 = SS * (N_1/N_1+N_2)$ and $n_2 = SS * (N_2/N_1+N_2)$.

In the above example, for LPC Group 1, the CME will install 40 meters at CPA 2 sites. The sample at CPA 2 site will be randomly selected. The CME may choose to uninstall 40 meters (i.e.107-67=40) from CPA 1 and install those meters at the randomly selected samples at CPA 2. The CME may also choose to let all the 107 meters running at CPA 1 or switch off 40 meters and may choose to install 40 new meters at CPA 2 sites. The CME will decide which option to choose based on the site-specific conditions. The meters that are going to be uninstalled or switched off at CPA 1 site will be selected randomly.

The remaining LPC Groups will also follow the same approach as described above for LPC Group 1. This process will guarantee a uniform distribution of the monitoring samples throughout the PoA.

The purpose of the monitoring plan implemented for each SSC-CPA is to collect the following variables:

Parameter	Unit	Description	Symbol
Client	Name	Name of companies or building owners participating in a SSC-CPA	n/a
Exchange location	Address and	Each building involved in a SSC-CPA will	n/a

	GPS data	be identified by an address and GPS location	
Sector	Classification	Each client will be classified according to industry sector (eg. office, hotels, shopping centre, car park etc)	n/a
Room type	Classification	Each room or area within which a retrofit or refurbishment takes place will be classified (eg. meeting room, retail shop, bathroom, office etc)	n/a
Last Point of Control (LPC) group	Classification	LPC will be classified into four groups as stated in Section A.4.4.2. The LPC groups will be determined before or after the installation of efficient lighting devices.	n/a
Installation date	Date	The installation date will be used as the earliest starting date for emission reduction calculations for that SSC-CPA	n/a
Quantity of baseline lighting equipment removed	Number	This information will be used to determine the electricity consumption of baseline lighting equipment	n_i
Power of baseline lighting equipment removed	Watts	This information will be used to determine the electricity consumption of baseline lighting equipment	p_i
Quantity of project lighting equipment installed and operational	Number	This information will be used to determine the electricity consumption of project lighting equipment. Data is collected during the cross-check surveys of each monitoring period	n_k
Power of project lighting equipment installed	Watts	This information may be used to determine the electricity consumption of project lighting equipment	p_k
Operating hours of project lighting equipment	hours	This data will be collected during ongoing metering of project lighting equipment in the Project Sample Group	o_k

In order to monitor emission reductions, each SSC-CPA must follow the steps described below:

1. Baseline audit and determination of technology swaps
SSC-CPA implementers must conduct a detailed audit of target buildings to determine the number and type of lighting technologies to be retrofitted as part of the project. This information is then recorded in the PoA database and presented to the DOE at the time of CPA inclusion.

2. Data collection during retrofit
During the retrofit process SSC-CPA implementers must collect data on the number and power rating of equipment replaced and installed. Through this process a complete data set will be created listing the technical specifications of all lighting equipment, including:

- Lamp or luminaire type removed (baseline equipment) and installed (project equipment)
- Number of each lamp or luminaire type removed and installed
- Power rating of each lamp or luminaire removed and installed

This information will be entered and stored in the PoA database.

3. LPC group classification

The SSC-CPA implementer will classify the lighting equipment installed against LPC Groups in accordance with the procedure described in Section A.4.4.2. The LPC group classification will be entered and stored in the PoA database.

4. Baseline equipment scrapping

Each SSC-CPA implementer will ensure that all baseline equipment collected is scrapped to prevent leakage. In order to conduct an independent verification of the scrapping of baseline lighting equipment an independent auditor or environmental audit firm, approved by the CME, must be engaged. Lighting equipment collected during the distribution will be transported to a waste management company who will conduct the equipment scrapping. All storage and destruction processes will be independently verified and the result of such process will be presented to the verifying DOE.

It should be noted that the independent auditor will check that the quantity of baseline equipment collected and recorded in the database, matches the number that is scrapped by the waste management company. Because of the nature of the technology upgrades, it is possible that the number of project lamps and luminaires installed could be *less* than the number of baseline lamps removed. For example, an old inefficient luminaire may contain four tube fluorescent lamps, whilst the replacement contains two, more efficient lamps. The new energy efficient luminaire satisfies the service equivalence requirements of the methodology (AMS IIC v13 paragraph 2), however, it may do so with fewer lamps. Therefore, the leakage test described in the methodology (paragraph 17) will be satisfied by comparing the number of baseline equipment collected against the number scrapped, rather than the number of project equipment installed being compared to the number of baseline equipment scrapped. This approach is conservative because it ensures that the amount of equipment removed from the project site is compared to the amount of equipment scrapped, ensuring that there is no leakage of baseline technology from the project.

5. Metering of project lighting equipment

Monitoring a sample of installed lighting equipment to determine average hours of utilisation (o_k) will be undertaken by installing metering equipment in LPCs belonging to each Project Sample Group (PSG). The selection of PSG buildings will be as per the sampling approach described in section A.4.4.2 above. The annual operating hours of monitored devices will be used to determine the energy baseline as per equations listed in E.6.2. above.

The mean hours of use use of lighting equipment found in PSG LPCs will be directly extrapolated to all LPCs involved in the SSC-CPA. The purpose of establishing the PSGs is to create a *representative sample* of all other LPCs and their respective lighting systems participating in the efficient lighting initiative. It is not possible to monitor *all* LPCs involved in a SSC-CPA, and it is a fundamentally agreed scientific and statistical procedure to apply mean values obtained through sampling to the broader population. Therefore, for each monitoring period mean values will be obtained for energy consumption calculation for the project and baseline scenarios which will be extrapolated across the unmetered LPCs operating during that monitoring period. This will be used in the calculations of project and baseline emissions as stipulated in the equations provided in section E.6.2. above.

6. Periodic cross-check survey

A sample of non-metered LPCs will be surveyed to determine proportion of energy efficient lamps and equipment operational during the preceding monitoring period.

A non-metered sample of lighting equipment installed in LPCs will be surveyed at least annually to measure the proportion of equipment still in operation. As with the PSG, the Project Cross-Check Group (PCCG) will be selected according to the sampling plan detailed in Section A.4.4.2 above. The LPCs included in each of the PCCGs will be randomly selected from the database of participating buildings. The result of this sampling will determine the proportion of the total number of devices still operating at the end of each monitoring period which will be applied to the calculation of emissions reductions for that period.

As discussed above, the results obtained from the sampling process will be directly extrapolated across the entire population of LPCs in the CPA. Therefore, the proportion of equipment installed and continuing to function as determined through the cross-check survey will be taken to be representative of the pattern occurring in all LPCs.

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)

>>

16th December 2011

Geoff Sinclair

Standard Bank Plc

Philip Cohn

RAMP Carbon Pty Ltd

Anil Bhatta

Cool nrg International Pty Ltd

Annex 1

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

Organization:	Standard Bank Plc
Street/P.O.Box:	20 Gresham Street
Building:	
City:	London
State/Region:	
Postfix/ZIP:	EC2V 7JE
Country:	United Kingdom of Great Britain and Northern Ireland
Telephone:	+44 20 3145 6890
FAX:	+44 20 3189 6930
E-Mail:	co2@standardbank.com
URL:	www.standardbank.com
Represented by:	Geoff Sinclair
Title:	Head of Carbon Sales & Trading
Salutation:	Mr.
Last Name:	Sinclair
Middle Name:	
First Name:	Geoff
Department:	Energy Sales &Trading
Mobile:	+44 7769 648 695
Direct FAX:	+44 20 3189 6930
Direct tel:	+44 20 3145 6893
Personal E-Mail:	geoff.sinclair@standardbank.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in the development of this PoA

Annex 3

BASELINE INFORMATION

Baseline information is provided in section E.4 of the PoA-DD.

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Annex 4

MONITORING INFOMRATION

The monitoring plan is described in section A.4.4.2 of the PoA-DD.