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):

Title: Energy Efficiency of Nigeria's Residential Lighting Stock by Distributing up to 40 Million Compact Fluorescent Lamps (CFLs) to Residential Households Connected to the National Grid
Version: 10
Date: 24/04/2012

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
2. Policy/measure or stated goal of the PoA
3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

Introduction

Nigeria, with a population of more than 150 million people, is the most populous country in Africa. Like most developing countries in Sub-Saharan Africa, Nigeria has considerable, sup-pressed and unmet electricity demand such that most of the country's inhabitants endure chronic power shortage. The major power gaps seriously impede the growth of the non-oil sector and, as a result, job creation and poverty reduction. About 45% of the population have access to electricity, with only about 30% of their demand for power being met. It is estimated that some 90% of industrial customers and a significant number of residential and other non-residential customers provide their own power through generators, at a huge cost to themselves and to the Nigerian economy. The high greenhouse gas-emitting off-grid diesel power generators cost about 35 Naira ($0.23) a kWh compare to the grid based tariff of 6 Naira ($0.04) per kWh[1]. The total capacity of power self-generation units in Nigeria is estimated at about 2,500MW[2].

Rural electricity access in Nigeria is minimal at 20%[3]. Most of the rural population are almost wholly reliant on wood fuel and kerosene lantern for light. The household sector accounts for 45% of the energy generated from the national grid with lighting accounting for approximately 43% of household energy consumption[4]. The Federal Government heavily subsidises household electricity. According to the Nigeria Energy Commission, the Federal Government will incur N177 billion ($1.2 Billion) in electricity subsidy to poor household consumers over a three years period[5]. Moreover, the introduction of the Multi-

[1] http://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/Nigeria_CTF_IP_-REVISED_Nov%2010%202010.pdf

[2] Africa Development Bank Group, Nigeria Economic and Power Sector Reform Program (EPSERP) Appraisal Report, Page 6. http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Nigeria%20Energy%20sector%20Reform%20Program.pdf

[3] Office to the Secretary of the Government of the Federation: Renewable Electricity Policy Guideline, http://www.osgf.gov.ng/Index.php?p=PowerPolicy

[4] Nigeria's Experience on the Application of IAEA's Energy Models (MAED & WASP) for National Planning by A.S samboo et el: Page 11(iii) and Page 7, Table 1: Summary of Computations for the Household Sector, http://www.energy.gov.ng/index.php?option=com_docman&task=doc_view&gid=4

[5] Energy Commission of Nigeria. Article: FGC to Incur N177 Billon in Energy Subsidy - NERC http://www.energy.gov.ng/index.php?option=com_content&task=view&id=54&Itemid=58

Year Tariffs Order (MYTO) means that from 2008, individual household will experience substantial increase in electricity tariffs and bills[6].

Energy efficient lighting such as compact fluorescent lamps, henceforth referred to as CFLs, can suppress the chronic power shortage in Nigeria, and promote clean energy usage in the region. This is because household lighting in the domestic sector in developing countries is mainly provided by energy intensive incandescent light bulbs (ICL). CFLs are energy saving lights with many times the efficiency of incandescent light bulbs and can last up to ten times longer. Furthermore, CFLs can provide the same amount and quality of light as incandescent light bulbs whilst using less than one–fifth of the electricity consumed by incandescent light bulbs.

Lighting contributes significantly to energy as well as peak demand, and is therefore a good target for demand-side energy efficiency initiatives because of the prevalent use of inefficient lighting technologies, especially in the residential sector. Thus, energy efficiency programme targeting nationwide implementation of efficient lighting technologies can effect transformational change. From a national perspective, the programme will enhance energy security by freeing up extra generation capacity and reducing the need for fuel, which is vulnerable to price variations and availability constraints. At the same time, the programme will help offset the impact of higher tariffs. Thus the programme will offer substantial benefits to consumers, utilities, and governments whilst lessening the impact of energy consumption on the local and global environment.

In recent years, many developed countries including the UK and US have been quick to access the benefits of CFLs by implementing gradual roll-out of incandescent light bulbs. Australia is one of the developed countries that have outlawed the use of incandescent light bulbs in residential households. Ghana, a developing country in Sub-Saharan Africa has been able to curtail power shortage by introducing energy efficient CFLs across the country.

The proposed Programme of Activities (PoA) seeks to promote energy efficiency in Nigeria by replacing incandescent lights bulbs used in most grid-connected households in Nigeria to a more energy efficient alternative, CFLs. These energy saving CFLs will benefit communities and the nation as a whole, result in energy conservation that will reduce households and Federal Government electricity spending, and abate greenhouse gas emission.

1. General operating and implementing framework of PoA.

The PoA will distribute/install approximately 40 million quality long life CFLs to residential households that are connected to the national grid across Nigeria. The PoA will be carried out as a series of Small-scale CDM programme of activities (SSC-CPA). Each SSC-CPA will replace incandescent light bulbs in grid-connected residential households with quality long-life CFLs. Exchanged incandescent light bulbs will be destroyed according to acceptable national norms.

Icimi Ltd is the coordinating/managing entity for the PoA and will act as the focal point for the Executive Board of the CDM in all aspects relating to validation, verification, registration and issuance of carbon credits generated by the programme. The coordinating and managing entity will collaborate with key industry partner

[6] MYTO: New, higher electricity tariffs regime that set tariff for electricity customers for a five-year period at a time. Under the regime, average household electricity tariff will increase from N6 (6 Naira) to N10 (10 Naira) per kwh. Source: http://www.tcnng.org/AppropriatePricing.aspx Under the multiyear tariff order, the market is to determine electricity tariff pricing

organisations as well as local support organisations, communities and local government offices in order to deploy the programme of activities.

SSC-CPA project implementer(s) is identified in the respective SSC-CPA-DDs.

2. Policy/measure or stated goal of the PoA

There are no mandatory policies or regulations for the adoption of energy saving lights such as CFLs by households in Nigeria. The goal of the PoA is to achieve a nationwide transformation of households lighting through the adoption and utilization of energy efficient lighting (CFLs) in residential households throughout Nigeria. To achieve the stated goal, the PoA will replace incandescent light bulbs with up to 40 million CFLs in residential households that are connected to the national grid across the nation.

Based on the above, the PoA will accomplish the following:

- Effect a nationwide change to a more energy efficient lighting stock
- Reduce environmental pollution and greenhouse gas emissions through avoided electricity usage
- Contribute to sustainable development of the region whilst alleviating poverty
- Significantly reduce household electricity cost thus representing huge saving to individual household
- Improve living standard and reduce poverty especially in rural area where approximately 80% of people live below the poverty line[7], and where only 20% of households are electrified[8]
- Reduce governmental expenditures in form of electricity subsidies and fiscal deficits.
- Ease the chronic shortage of electricity supply by promoting energy conservation and improving energy security
- Change mindset and raise awareness of the benefits of energy conservation and clean energy.

The proposed SSC-PoA will contribute to sustainable development through environmental, economical, technological and social well being identified below:

Environmental well being

This PoA will achieve effective utilisation of energy at household level in Nigeria, which could lead to adaptation and investment in clean and efficient energy technologies in future. For the population especially rural communities and households that are connected to the national grid, there will be less reliant on traditional and conventional sources such as wood, batteries, candles, kerosene lanterns and paraffin due to lack of disposable income to buy conventional light bulbs or pay electricity bills. Traditional and conventional alternatives are not only expensive and non-sustainable, but they can also be hazardous and can damage the environment and its people. Thus the PoA will also help to curtail the chronic aftermath of using inefficient lighting sources, such as lung diseases and environmental pollution.

[7] http://www.ruralpovertyportal.org/web/guest/country/home/tags/nigeria
[8] Office to the Secretary of the Government of the Federation: Renewable Electricity Policy Guideline, http://www.osgf.gov.ng/Index.php?p=PowerPolicy

The number of households in Nigeria that are dependent on the use of biomass is 21.5 million, and the burden of disease and yearly death attributable to biomass use is 4% and 79,000 people respectively[9].

On 10/11 November 2008, a national dialogue to promote renewable energy and energy efficiency in Nigeria was organised by the Community Research and Development Centre (CREDC) in Abuja, Nigeria. The conference concluded that finding policies and actions that would drive energy development and at the same time address the challenges of climate change were pre-requisite to achieving the Millennium Developmental goals (MDGs), and reducing poverty. CREDC acknowledged that access to energy was essential for socio-economic development and for poverty alleviation in Nigeria. Furthermore, the conference recognised renewable energy technologies including CFLs and energy efficiency measures as promising solutions to Nigerian energy crises[10]**.** However, to-date, no policy on the use of renewable energy technology such as CFLs has been implemented in Nigeria**.**

Thus the PoA supports the findings of the CREDC on climate change and energy efficiency, which include:

1. Enhance stakeholder capacity to advocate for energy efficiency and promote renewable energy technologies.
2. Create awareness on the concept of energy efficiency and clean energy usage.
3. Develop strategies to integrate energy efficiency policy into Nigeria's environmental policy framework.

Economic Sustainability

The Nigerian government has identified energy access as a major factor to economic growth and sustainability. This is because continuous power supply at the required quantity and quality remains a critical challenge for Nigeria. According to the World Bank, electricity crisis is a crucial infrastructure bottleneck and the most important constrain to doing business in Nigeria[11]. The country has 5700MW of grid-based generating capacity. As at August 2010, the peak generation supplied by the national grid was 3804MW for a population of 150 million[12].

CFLs will increase electricity access whilst reducing energy consumption at the household level because the energy efficient bulbs that are introduced will generate more electricity with less energy leading to more energy being saved. This ensures that more energy is available to power economical development, and extends electricity supply to other parts of the country such as the rural areas that endure chronic shortage of power supply. A typical CFL bulb of 15 watts which has an equivalent lumen output to a 60 watt incandescent bulb can save up to 75% energy compared to a 60 watt incandescent bulb.

[9] CREDC: National Dialogue to Promote Renewable Energy and Energy Efficiency in Nigeria, Page 8 http://www.credcentre.org/Publications/Abuja_conference.pdf

[10] CREDC: National Dialogue to Promote Renewable Energy and Energy Efficiency in Nigeria, Page 8 http://www.credcentre.org/Publications/Abuja_conference.pdf

[11] The World Bank in Nigeria 1998-2007, Nigeria Country Assistance Evaluation, Page 55 http://lnweb90.worldbank.org/oed/oeddoclib.nsf/DocUNIDViewForJavaSearch/37AFE7820EF36456852577680684067/$file/nigeria_cae.pdf

[12] Roadmap for power sector Reform: A Customer-Driven Sector-Wide plan To Achieve Stable Power Supply, Page 16 (Graph) http://www.esmap.org/esmap/sites/esmap.org/files/Roadmap%20for%20Power%20Sector%20Reform%20Full%20Version[1].pdf www.nigeriapowerreform.org

In view of the above, the SSC-PoA will contribute significantly to Nigeria's economic sustainability in the following ways:

1. Increase Disposable Income and alleviate poverty

The use of CFLs will reduce energy consumption and energy bills, which in turn will increase the amount of disposable income per households and reduce the level of poverty. Despite Nigeria being a major oil producing nation, the average per capital income is $1,180[13] and 84% of the population lives on less than $2 per day[14]. A quality CFL can provide more than 10,000 hours of lighting for eight to ten years without the need for a replacement while most incandescent light bulb provides 1,000 hours or less of lighting and last an average of one year. Therefore, CFLs will boost household income and reduce poverty because compared to incandescent light bulbs; CFLs provide significant money saving opportunities to the user.

2. Reduce cost of governmental electricity subsidies

The Federal Government of Nigeria provides subsidies to ensure adequate funding of a lifeline tariffs for the urban poor and the rural population in the country through the Power Consumer Assistant Fund[15]. In 2008, the Federal Government commissioned a 2008 – 2013 regime of Multi Year Tariff Order (MYTO) to provide a subsidy of N177.95 billion ($1.2 billion) to support shortfall in tariff.[16]. Therefore the PoA may significantly reduce the cost incurred by the Federal Governmental from electricity price tariff.

3. Create new revenue source for the Federal Government

The programme may reduce the building of new power stations and thus free-up much needed revenue for the Federal Government. In 2005, the World Bank estimated that to increase electricity access in Nigeria from 45% to 75% would require over $10 billion in investments[17]. To redress chronic power shortage in Nigeria, the Federal Government of Nigeria enacted the Electric Power Sector Reform Act (EPSRA) in May 2005 and launched the National Integrated Power Projects (NIPP) initiative in 2006 with the goal of bridging the immediate supply/demand gap and reducing the bottlenecks in electricity delivery system[18]. Under the initiative, the Federal Government agreed to inject US$5.34 billion between 2009 and 2012 for new electricity generating infrastructure[19]. Thus the PoA may avoid the need for a large scale thermal power plant which will not only reduce governmental expenditure but also significantly reduce greenhouse gas emission.

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[13] World Bank GNIPC Statistics http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf

[14] Source: TradingEconomics.com - World Bank Indicator – Nigeria Poverty Rate: http://www.tradingeconomics.com/nigeria/poverty-headcount-ratio-at-dollar2-a-day-ppp-percent-of-population-wb-data.html

[15] http://www.vanguardngr.com/2010/12/power-fg-to-review-current-multi-year-tariff-order/

[16] http://www.vanguardngr.com/2011/07/electricity-tariff-goes-up-18/

[17] IFI Policy Influence in Nigeria's Energy Sector: http://www.brettonwoodsproject.org/update/60/bwupdt60_ai.pdf

[18] Africa Development Bank Group -Nigeria Economics and Power Sector Reform Appraisal Report, page 7 http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Nigeria%20Energy%20sector%20Reform%20Program.pdf

[19] Ibid (Page 8)

Technological and social Sustainability

The SSC-PoA will create jobs, provide better living conditions and a source of livelihood for communities especially people in rural areas where there is high level of unemployment. The programme will engage local labour force to carry out the project activities. Thus, the PoA will transfer technological know-how in energy efficiency, installation, management and procurement to Nigeria as well as deliver social benefits that include poverty alleviation, climate change awareness, improved living condition, community engagement, capacity building, energy efficiency education amongst others.

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

There is no law, policy or mandatory requirements in Nigeria requiring the use of energy efficient CFL at the household level. The coordinating/managing entity will voluntarily undertake the SSC-PoA in order to effect a nationwide adoption of energy efficiency lighting in Nigeria. Therefore all key players including partner organisations and households participating in the proposed SSC-PoA are voluntarily taking part in the project activities.

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

1. Coordinating/managing entity of the SSC-PoA is the entity which communicates with the Board **The coordinating / managing entity of the SSC-PoA is Icimi Ltd.**
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. **The SSC-CPA project implementers are identified in the respective SSC-CPA-DDs.**

Name of Party Involved(*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Nigeria (host)	Icimi Ltd	No
United Kingdom		
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

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

A.4.1. Location of the programme of activities:

Federal Republic of Nigeria

A.4.1.1. Host Party(ies):

Federal Republic of Nigeria

A.4.1.2. Physical/ Geographical boundary:

The geographical area within which all SSC-CPAs in the programme will be implemented is the Federal Republic of Nigeria.

Geographical Map of Nigeria

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

- Icimi Limited, as the PoA coordinating/managing entity, will coordinate the PoA and will support the SSC-CPA implementer(s) in implementing the SSC-CPAs under the PoA;
- The SSC-CPA will apply small scale methodology AMS-II.J – Demand-side activities for efficient lighting technologies, version 4;
- The aggregate electricity savings by each SSC-CPA may not exceed the equivalent of 60 GWh per year;
- The project activity shall be designed to limit undesired secondary market effects (e.g., leakage) and free riders by undertaking at least one of the following actions:
    - Directly installing the CFLs;

  - Charging at least a minimal price for efficient lighting equipment i.e. providing CFL at an equivalent cost of an incandescent light bulb and/or where a household requires more than four CFLs, additional CFL may be provided at an equivalent cost of an incandescent light bulb;
  - Restricting the number of free (CFLs) lamps per household distributed through the project activity to six;
- SSC_CPA will distribute/install CFLs to grid-connected residential households in exchange for incandescent light bulbs;

- SSC-CPA can distribute CFLs and replace incandescent light bulbs via one or more of the following methods:
  - SSC_CPA will operate a direct installation of CFLs at each grid-connected residential household in exchange for incandescent light bulbs. Exchanged incandescent light bulbs will be collected at the time of CFL installation; and/or
  - Door-to-door distribution to each household (where direct installation is not possible) and collection of incandescent light bulbs at the time of CFL distribution;
  - CFL distribution and incandescent light bulb collection can take place via a dedicated distribution point advertised in the local media by SSC-CPA implementer.

- CFL installer will receive adequate training including specific guideline and education that CFL should be installed in high usage areas such as communal areas in the home;

- Where direct installation is not possible, SSC-CPA implementer shall educate the recipient to install CFLs in high usage areas. The methods of education may include but not limited to verbal education, leaflets contained in CFL packs;

- SSC-CPA can distribute/install between 600,000 to 1,000,000 CFLs;

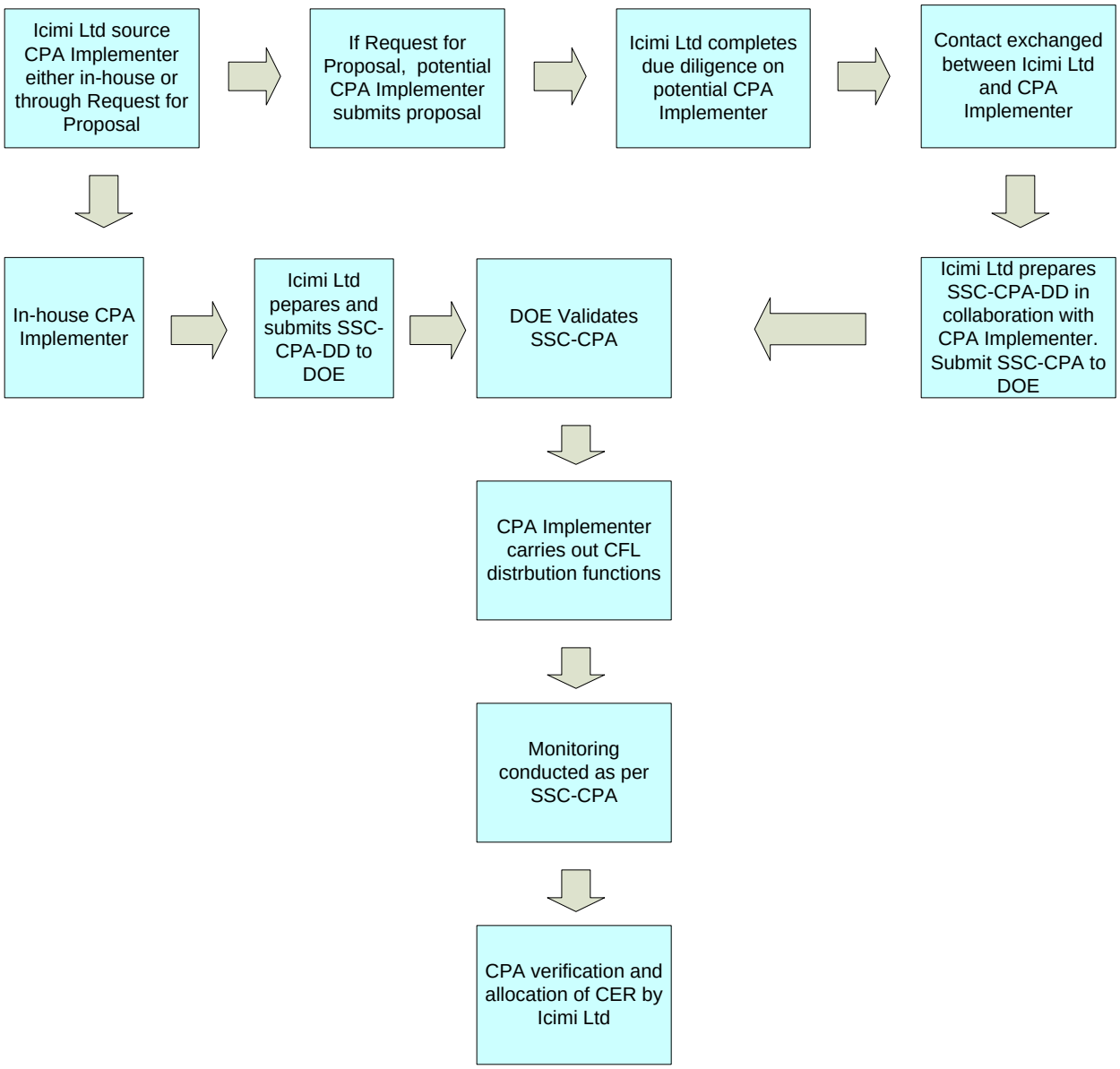
- A dedicated local centre(s) will be established where participating households can drop-off broken CFLs, and exchange faulty or fused CFLs for new ones – free of charge – within the first 12 months of CFL installation, upon production of residential proof;

- SSC-CPA implementer(s) will arrange for the collection and destruction of incandescent light bulbs. Replaced incandescent light bulbs will be collected directly from households or from the dedicated distribution /collection points, transported securely and stored in a secured centralised warehouse or multiple storage sites. SSC-CPA implementer(s) will ensure that incandescent light bulbs collected are reconciled to the CFLs distributed/installed, and destroyed in accordance with applicable environmental norms in Nigeria;

- SSC-CPA implementer will ensure that collection and destruction of incandescent lights bulbs are recorded so that they can be randomly and independently verified by an appointed qualified third party;

- SSC-CPA shall apply a fixed value of 3.5 hours to estimate the CO_2 emission reductions under the CDM project.

A typical Project Implementation Process Sequence



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

- The SSC-CPA will employ self-ballasted (integrated) compact fluorescent lamps (CFLs) to replace incandescent lamps in residential households. A self-ballasted CFL is an integrated lamp-ballast combination consisting of a gas-filled tube, and electronic ballast. The gas in the tube glows with ultraviolet light when electricity from the ballast flows through it. This in turn excites

a white phosphor coating on the inside of the tube, which emits visible light throughout the surface of the tube;

- Each CFL will be a new equipment and will not be transferred from another activity;
- The total lumen output of the CFL should be equal to or more than that of the incandescent light bulbs being replaced.
- Each CFL will meet light output requirements in accordance with the relevant national or international standards/values as detailed in Table 1A AMS II.J, Version 4, below;

Table 1: Light Output Requirements

Baseline Technology - Incandescent Lamp (Watt)	Minimum Light Output (Lumen)
25	230
40	415
50	570
60	715
75	940
90	1,227
100	1,350
150	2,180
200	3,090

- CFLs will have a known ex ante rated average life that meets the requirements of IEC 60969 or an equivalent national standard. DOE will confirm compliance with the requirements of applicable standard at the first verification;
- CFLs used in the SSC-CPAs may be sourced from a number of manufacturers/suppliers
- In addition to the standard manufacturer's lamp specifications, CFLs used in the SSC-CPA will be legibly and permanently marked with the following information:
    - Manufacturer's name or Logo
    - Unique serial number pertaining to the particular SSC-CPA
    - Icimi Ltd name or Logo and where applicable, a 'Not For Sale or Resale' sign
    - The applicable Standard

- CFL distributors/installers will wear identifiable uniform and carry identification at all time during CFL distribution/installation;
- Each CFL pack will include informative and instructive leaflet;
- SSC-CPA will carry out an education campaign through one or more mediums in order to educate households and communities on the project activities.

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

Each CPA must satisfy the following criteria in order to be incorporation in the programme:

- SSC-CPA will conform to the PoA and follows the baseline and monitoring methodology AMS II.J version 4;
- CFLs distributed/installed by the SSC-CPA will be to grid-connected residential households within the geographical boundary of Nigeria;
- Leakage, additionality, baseline emissions, eligibility and double counting are clearly defined and
- compliant with AMS II.J/Version 4;
- The proposed SSC-CPA is not registered, or is being registered, as a stand-alone CDM project or as part of another PoA other than the proposed project;
- SSC-CPA will meet the de-bundling rules set out in EB 54, Annex 13, Guidelines for Assessment of De-bundling for SSC Project Activities (Version 3);
- The SSC-CPA will ensure that there is no other registered and operating SSC-CPA or CDM project concern with the distribution of energy efficient lighting bulbs within the specified geographical location/area;
- SSC-CPA will apply daily operational hours of 3.5 hours per 24 hour period;
- The SSC-CPA will have the approval of the coordinating/managing entity and validation of the DOE;
- If CPA implementer is outsourced, contractual agreement signed between Icimi Ltd and CPA implementer;
- SSC-CPA must be uniquely identified and defined in an unambiguous manner by providing detailed geographic information, the exact start date and end date of the crediting period;
- The SSC-CPA has unambiguously established baseline scenario, baseline emissions, defined and accounted for leakage, additionality, eligibility and deal with double counting thoroughly and conservatively.

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.

Aside from the information that shows the proposed PoA is a voluntary and coordinated action that cannot occur in the absence of PoA, additional information relating to proof of technology transfer, knowledge innovation, use of Overseas Development Assistant (ODA) fund and previous announcement of PoA are presented as part of the Gold Standard requirements.

The propose PoA is a Voluntary Coordinated Action

The proposed PoA is a voluntary coordinated action. There are no national law, policy or mandatory requirements in Nigeria requiring the use of energy efficient light such as CFLs. The programme requires voluntary participation by all key players including individual household.

The proposed voluntary coordinated action would not be implemented in the absence of the PoA

The voluntary coordinated action would not be implemented in the absence of the PoA because of barriers which include: household capital versus cost of CFLs, prevailing practises and socio-economic condition at the household and national level in Nigeria. Furthermore the technology, mass scale use of CFL, is first-of-its-kind in Nigeria. Therefore the voluntary coordinated activity is not viable in the absence of CDM due to the aforementioned barriers.

Previous Announcement Check/Consideration of CDM

There has not been any private/public announcement that the PoA will proceed without CDM. CDM has been central to the development of the PoA from the beginning and the financial viability of the PoA depends on the sale of CERs generated from the CDM. Therefore in the absence of CDM the proposed voluntary programme would not be implemented.

Outlined below are significant steps and milestones that confirm the intention of the project proponent to develop the project as a CDM initiative:

- Between January 2011 and April 2011, the coordinating/managing entity carried out feasibility study and field survey in order to assess the environmental, social and economical impact of mass scale adoption of energy saving lights in Nigeria. Soon after, the coordinating and managing entity initiated dialogue with relevant government offices and local community representatives.

- In May 2011, the coordinating/managing entity met with the Nigeria Designated National Authority (DNA) in Abuja, Nigeria to discuss the PoA.

- In June 2011, decision was made by the coordinating/managing entity to proceed with the PoA.

- In July 2011, the coordinating/managing entity embarked on the preparation of the PDD document and the sourcing of potential strategic partners.

- In October 2011, the Nigerian DNA approved the PoA. Soon after the approval of the PoA, potential DOEs were sort in order to begin the validation process.

Additionality Tool

The additionality of the proposed PoA is demonstrated using the criteria outlined in attachment A to Appendix B of the simplified modalities and procedures for small scale CDM activities. UNFCCC ‘Tool for the demonstration and assessment of additionality’ will be used to determine additionality.

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

Sub-step 1a. Define alternatives to the project activity

In the absence of the PoA, three alternatives that are consistent with Nigeria's laws and regulations exist. The three scenarios are examined below:

Alternative Scenario 1

The PoA could be implemented as Non-CDM project through a government-sponsored initiative. Under such initiative, the Federal Government of Nigeria will purchase and distribute CFLs free-of-charge or at a minimal cost (i.e. CFLs sold to households at equivalent price of incandescent light bulbs) to grid connected residential households throughout Nigeria.

This scenario is not applicable as there is no policy or mandated legal requirement at the governmental level in Nigeria for the replacement of incandescent light bulbs with energy saving lights such as CFLs. Furthermore there is no government initiative concern with mass-scale country-wide distribution of CFLs to grid-connected households throughout Nigeria being implemented.

Given the current status of electricity access in Nigeria – where installed electricity- generating capacity stands at a minimal 5,700 MW (approximately) for a population of 150 million, it is fair to assume that government might look at increasing electricity access through conventional power plants such as thermal power plants. For instance, as part of the National Integrated Power Projects (NIPP), in 2006, the Federal Government agreed to inject US$5.34 billion between 2009 and 2012 for new electricity generating infrastructure such as thermal power plant[20].

This alternative is not a credible alternative and therefore it is not applicable to the PoA.

Alternative Scenario 2

The activity could occur without a PoA through autonomous replacement of incandescent bulbs with new lighting devices with same or greater efficiency by individual households across Nigeria. However, for this scenario to achieve the stated goal of the PoA, which is a nationwide adoption and use of energy saving lights in residential households across Nigeria, requires a significant percentage of the population to take up the use of CFLs. This means that individual household will replace incandescent light bulbs with CFLs at a substantial cost to themselves.

The barrier to this alternative is the socio-economic condition in Nigeria. The average retail price of a CFL (at $4 upwards) is very high when compared to the average annual per capita income of $1180[21] in

[20] Africa Development Bank Group -Nigeria Economics and Power Sector Reform Appraisal Report: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Nigeria%20Energy%20sector%20Reform%20Program.pdf

[21] World Bank GNIPC Statistics http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf

Nigeria. Significantly, the cost of a single CFL represents unfathomable expenditure for the 84% of the population that lives on less than $2 a day[22].

This alternative is not credible due to the existing barrier, and therefore it is not applicable to the PoA.

Alternative scenario 3:
This is the business as usual scenario. This alternative is the continuation of the current practise in Nigeria whereby households use conventional and inefficient incandescent light bulbs.

This is a credible alternative. It is the as-is scenario in most Nigeria households today and reflects the baseline situation.

Outcome of Sub-step 1a
Out of the three alternative scenarios identified above, the only realistic and baseline scenario to the PoA is Alternative 3, the continuation of the current practise of using inefficient lighting source such as incandescent light bulbs.

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

- The following three alternative scenarios discussed above are consistent with mandatory laws and regulations in Nigeria:
  - Project developed as non-CDM initiative through a government-sponsored programme
  - The autonomous replacement of incandescent bulbs with new lighting devices with same or greater efficiency by individual households across Nigeria
  - The continuation of the current practise in Nigeria whereby households use conventional and inefficient lighting source such as incandescent light bulbs.
- The programme is not the only alternative which is consistent with mandatory laws and regulations, and the programme is therefore additional.

Sept 2. Investment Analysis

Sub-step 2a Determine appropriate analysis method
The SSC-CPA involves the distribution of free CFLs or the provision of CFL(s) at an equivalent price of an incandescent light bulb to grid connected households in Nigeria. The CPAs included in the PoA will not generate any financial benefit other than CDM related income when CFLs are distributed free-of-charge. Furthermore, the provision of CFLs at an equivalent price of incandescent light bulbs will only generate very little and non-material revenue and negative NPV/return in the absence of CDM due to the upfront costs of purchasing and distributing CFLs. Thus investment barrier is a key barrier to the SSC-CPA implementation and the barrier can only be overcome with CDM.

[22] Source: TradingEconomics.com - World Bank Indicator – Nigeria Poverty Rate: http://www.tradingeconomics.com/nigeria/poverty-headcount-ratio-at-dollar2-a-day-ppp-percent-of-population-wb-data.html

A simple cost analysis showing the project activities NPV with and without CDM consideration is used to demonstrate investment barrier faced by the project in the absence of CDM. The PoA-DD financial spread-sheet template is provided to DOE.

Step 3. Barrier Analysis

Sub-step 3a. Identify barriers that would prevent the implementation of the proposed CDM project Activity without CDM

To comply with the guidance given in attachment A to Appendix B of the *'simplified modalities and procedures for small-scale CDM project activities'*, the following barrier analysis will be conducted: access to capital, technology, information asymmetric and behavioural barrier. The analysis will show that the presence of one or more of these barriers will prevent the proposed project being carried out in the absence of CDM.

Lack of Access to Capital

Perhaps the most crucial factor impeding the adoption of energy efficient lights in developing countries like Nigeria is the lack of sufficient capital at the household level. The average retail price of a 15 watt CFL is approximately $4 while the average sale price of a standard incandescent light bulb is $0.50. In many developing countries, particularly in Sub-Saharan Africa, insufficient disposable income makes the purchase of CFLs a major capital expenditure. The average annual per capita income in Nigeria is $1180[23] and 84%of the population (approximately 126 million people) live on less than $2 a day[24]. The population, particularly those that live below the poverty line, will not have the means or disposable income to bear the initial capital outlay for CFLs after accounting for food, shelter and clothing.

Information Barrier

In many parts of the world, especially in a developing country such as Nigeria, the lack of adequate information on energy efficiency including the benefits of energy saving lights such as CFLs means that people cannot make an informed decision that would aid the adoption of energy efficient lighting alternatives. More often than not, the only information available to the consumer is the price – in this case, the high cost of CFLs. Majority of consumers are not aware of the cost-benefit aspect of CFLs, which is that the initial high purchase price of a CFL will be offset by lower operating margin due to the higher efficacy and longevity of CFLs compared to conversional and energy intensive lighting bulbs such as incandescent light bulbs.

This misconception occurs partly because at the institutional level there are no policies and mandatory framework that promote the use of efficient energy saving lights such as CFLs. Households in Nigeria are served with estimated electricity bills by PHCN (NEPA). Such bills do not provide actual measurable and verifiable records on energy usage and savings by a given household. This type of practise does not inspire consumers to alter the ways they use energy so that more energy can be conserved.

Behavioural barriers – Prevailing Practice

[23] World Bank GNIPC Statistics http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf

[24] Source: TradingEconomics.com - World Bank Indicator – Nigeria Poverty Rate: http://www.tradingeconomics.com/nigeria/poverty-headcount-ratio-at-dollar2-a-day-ppp-percent-of-population-wb-data.html

The prevailing practice of using inefficient lighting sources such as incandescent light bulbs is a barrier to the programme implementation. Despite the long-run financial savings, energy conservation and the convenience of CFLs, many people are resistant to change and are set in their ways especially where the initial cost of switching is seen to be considerable. By distributing CFLs free or by providing CFLs at an equivalent cost of incandescent light bulbs to households, the PoA will achieve large scale diffusion of CFLs in Nigeria. Such large-scale diffusion of energy saving CFLs to millions households is a national transformation goal. The project represents first-of-its-kind in Nigeria and requires a primary and permanent shift in normal day-to-day energy awareness behaviour in homes as well as shift in habits that will overcome the aforementioned prevailing practices.

Technological Barrier

Despite the energy saving benefit and the long-run financial incentive of using CFLs, the lighting device account for just 6% of the global lighting markets[25]. The diffusion of efficient energy saving technologies, especially in developing countries such as Nigeria, is slow, in part, due to the absent of a dynamic market. There are some progressive utilities companies in Nigeria willing to partake in the CFL market by selling CFLs. However, the market price of CFLs would have to be heavily discounted at a cost to the Nigerian government for there to be a market for the product.

Therefore, without the proper policy-specific system in place such as government subsidy programme to support the functioning of CFL market, the efforts to bring the technology to life will not bear fruit. So, naturally most utilities companies abstain from entering the market. Few CFLs are sold in Nigeria; usually, these CFLs are of low-quality or knock-off with very short rated average life. Thus, the technology (CFLs) that will be employed in the proposed project activity is not readily available in Nigeria and when available, they are mostly counterfeit and therefore inefficient.

The above analysis demonstrates that the programme faces real and significant barriers. However, the barriers could be overcome if the proposed project is registered under the CDM scheme. This is because CDM will provide the carbon finance that will enable CFLs to be distributed free or at a discount to residential households which will eradicate the financial and technological barriers hindering the adoption of CFLs. Information asymmetry that exists will be addressed through various medium including educational and promotional activities that will be deployed before and during the implementation of the PoA.

Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives

The barriers identified above will not affect the baseline scenario – alternative 3 – the continuation of the current practise of using conversional and energy intensive incandescent light bulbs in households.

Step 4 Common Practise Analysis

The proposed project is "first-of-its-kind" in Nigeria. Therefore there is no comparable or similar activity and steps 4a and 4b are not applicable.

Overseas Development Assistance (ODA)

[25] OECD, Barriers to Technology Diffusion: 'The Case of Compact Fluorescent Lamps' Page5: http://www.oecd.org/dataoecd/46/12/37671771.pdf

If public funding is received by SSC-CPA(s) in the PoA, the SSC-CPA(s) will affirm that such funding does not result in diversion of ODA and is separate from and is not counted towards the financial obligations of those parties.

Proof of Technology Transfer/Knowledge Innovation

The SSC-CPA will lead to technology and knowledge innovation on many fronts. Technology transfer will occur between Nigeria and the country where CFLs will be sourced or manufactured. Also, Icimi Ltd will transfer knowledge and operating skills to the CPA implementer, allowing the CPA implementer to appropriate the technology that is being implemented.

Knowledge transfer will also occur through informative, educational materials on energy awareness and efficiency that will be distributed along with CFLs to households. The aim is to pass on the knowledge and thus enlighten and empower a population of people on the environmental and financial benefits of energy efficiency.

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:

(i) A record keeping system for each CPA under the PoA;
(ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA;
(iii) The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity;
(iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA.

To effectively implement the PoA, the coordinating/managing entity, Icimi Ltd will establish a series of operational activities and key management tasks to be accomplished in other for those operational activities to be successfully executed. The operations and tasks are categorised into four main activities, shown in the table below:

Operational activities	Management tasks and Arrangements
PoA Development	• Plan, design and develop PoA document and related document, ensuring compliance with CDM registration process.
Host Country Approval	• Obtain Letter of Approval from Host country, Nigeria. Seek DOE, CFL distributors and other partners
Stakeholder Consultation	• Public announcement of stakeholder consultation. • Execute stakeholder consultation
SSC-CPA Implementation	• Determine the most effective and efficient approach to SSC-CPA implementation: enlist CPA

	implementer in-house or outsourced to a service provider via Request for Proposal • If CPA implementation is outsourced, sign contractual agreement.
SSC-CPA inclusion in PoA and quality assurance check	• Design and include SSC-CPA in PoA ensuring compliance with CPA inclusion process for SSC-CPAs
Awareness Campaign	• Embark on extensive awareness campaign, under the name *'Better-Light Nigeria'* to introduce the project to the public and increase nationwide awareness of CFL technology in Nigeria.
Monitoring and Verification of SSC-CPA	• Ensure compliance with the monitoring and verification activities stipulated in the monitoring plan contained in the PoA and SSC-CPA documents. • Vet monitoring data and supporting evidence prior to submission to DOE for registration • Submit monitoring report/plan to DOE • Engage the service of verifying DOE to carry out independent verification of the SSC-CPA
CER Allocation	• All resulting CERs from the SSC-CPA will be allocated by the UNFCCC to the managing/coordinating entity, Icimi Ltd

In addition to the above operational activities and accompany tasks, the following procedures will be implemented to ensure the accuracy and effectiveness of the proposed PoA.

SSC-CPA Record keeping

SSC-CPA implementer will formulate and maintain a standardized data recording format and SSC-CPA database approved by the coordinating/managing entity for each SSC-CPA in order to maintain appropriate records documenting the following variables inter-alia:

- The physical geographic location of each CFL distributed and installed;
- The specifications i.e. nameplate and rated power of incandescent light bulbs exchanged and CFLs distributed and installed at households participating in the SSC-CPA;
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date of replacement;
- The name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFL recipients;
- Signature of CFL recipient that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.
- Record of destruction of incandescent light bulbs
- If applicable, record of recycle of broken, fused/faulty CFLs

Procedure to avoid double Counting

In order to ensure that the SSC-CPA registered under the PoA does not overlap with another CDM project activity or a SSC-CPA of another PoA, the following checks will be carried out by the managing/ coordinating entity:

- Check the UNFCCC CDM database to ensure that no other CDM project activity or a SSC-CPA of another PoA that utilises energy efficient lighting technology has already been registered in the same geographical area;
- Where a SSC-CPA of another PoA or CDM project activity utilising energy efficient lighting technology is already registered in the same geographic area as a proposed SSC-CPA, the coordinating entity will not proceed with the registration of the SSC-CPA;
- Each SSC-CPA has unique geographical boundary which is determined by the location of households where CFLs are installed;
- Each SSC-CPA within the proposed PoA will keep record of door-to-door distribution/installation of CFLs to households connected to the electricity grid within a specified geographical boundary;
- Ownership of CERs from the PoA belongs to the coordinating/managing entity, Icimi Ltd.
- Households participating in the SSC-CPA are aware and voluntarily agree that CERs generated from the SSC-CPA belong to the coordinating/managing entity;
- CFL supplier will sign a contractual agreement that will unequivocally states that the ownership of all carbon rights and CERs generated from the SSC-CPA belong to the managing and coordinating entity, Icimi Ltd.

De-bundling

The CDM EB 47 meeting report Annex 32, version 03 "Guidance for determining the occurrence of de-bundling under a PoA". Para 9 stipulate the following:

'If each of the independent subsystems/measures included in the SSC-CPA of a PoA is no greater than 1% of the small scale thresholds defined by the methodology applied, then that SSC-CPA of PoA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity'.

According to the requirement of AMS-II.J version 4, the maximum wattage rating of an incandescent light bulb which can be replaced under the program is 200 W and the wattage of an equivalent CFL is similar to 40 W. Hence the maximum annual energy saving potential from a measure taking 3.5 hours usage per day is = 3.5 * 365 *(200-40) = 0.0002 GWhr.

As per de-bundling criteria, 1% of the small scale threshold is 0.6 GWh per annum for a single measure.

As is demonstrated above 0.0002 GWhr per CFL is much less than the de-bundling requirement. Hence the SSC-CPA is not a de-bundled component of a large scale activity and therefore the SCC-CPA complies with EB 47, Annex 32, version 03 guidance.

Before inclusion of a SSC-CPA, check whether any other CDM project activity involving the distribution and the installation of CFLs is already operating, is registered or is seeking registration in the same specific geographic location as the proposed SSC-CPA using UNFCCC data.

Subscription to PoA

The coordinating/managing entity has the responsibility for the identification, development, registration and management of the SSC-CPAs in the proposed PoA. A legally bidding agreement among the coordinating/managing entity, the SSC-CPA implementers, distribution and monitoring partners means that all parties involved in implementing the SSC-CPAs are aware and agree that the SSC-CPAs are subscribed to the PoA.

Furthermore, project households are made aware of their participation in a climate change initiative that abate greenhouse gas emission, and by receiving CFLs, they are agreeing that their activity is being 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.

According to paragraph 19 of AMS-II-J version 4, monitoring includes: recording of lamp distribution data and *ex post* monitoring survey as defined in paragraph 18, AMS-II-J version 4.

Recording of Lamp distribution data

SSC-CPA implementer will formulate and maintain a standardized data recording formats and SSC-CPA database approved by the coordinating/managing entity, for each SSC-CPA in order to maintain appropriate records documenting the following variables inter-alia:

- The physical geographic location of each CFL distributed and installed;
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date replacement took place;
- The specifications i.e. nameplate and rated power of incandescent light bulbs exchanged and CFLs; distributed and installed at households participating in the SSC-CPA;
- Unambiguous identification including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFL recipient;
- Signature of CFL recipients that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.

Ex post monitoring surveys

Ex post monitoring surveys shall follow the guideline described in Appendix 4. A single *ex post* monitoring survey may be conducted across homogenous SSC-CPAs. A cluster of SSC-CPAs may benefit from one representative *ex post* monitoring survey, where such SSC-CPA's population can be demonstrated to be homogenous for example share demography criteria including geographical location, or socio-economic population.

PoA Programme Database

Monitoring will be carried out per SSC-CPA or SSC-CPA cluster to determine the greenhouse gas emission reduction achieved by each SSC-CPA under the PoA. In order to unambiguously determine the

emission reductions attributable to each SSC-CPA, the coordinating/managing entity will establish a PoA database which will include the following data-set for each SSC-CPA:

- The physical geographic location of each SSC-CPA
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date replacement took place;
- The specifications i.e. nameplate and rated power of incandescent light bulbs exchanged and CFLs distributed and installed in households participating in the SSC-CPA;
- Unambiguous identification including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFLs recipient;
- Record of destruction of replaced incandescent light bulbs, to prevent leakage;
- CFL purchase and dispatch records, to prevent double counting;
- Lamp failure rates**,** as determined by the ex post monitoring survey

The PoA database will record the start and end dates of each monitoring period and the emission reduction attributable to the monitoring period. The monitoring plan is designed to eliminate risk of double-counting between SSC-CPAs. Therefore rigorous record keeping procedures that include mutually exclusive dataset per SSC-CPA would be implemented to ensure that each monitoring period dataset can be transparently attributed to its corresponding SSC-CPA in order to prevent occurrence of double counting.

An appointed DOE will carry out the verification of each SSC-CPA. Verification by DOE will occur separately for each SSC-CPA or cluster SSC-CPAs at the end of each monitoring period. The coordinating/managing entity will produce a monitoring report corresponding to the monitoring period under consideration for the DOE to verify. This report will unambiguously set-out the data relating to the emission reductions generated by that specific SSC-CPA during the monitoring period.

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

If public funding is received by SSC-CPA(s) in the PoA, the SSC-CPA will affirm that such funding does not result in diversion of ODA and is separate from and is not counted towards the financial obligations of those parties.

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

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

1/12/ 2012

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

28 years

SECTION C. Environmental Analysis

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

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

Environmental analysis is done at PoA level as CFLs do not have a major detrimental environmental impact that would justify an individual assessment of each SSC-CPA.

Furthermore, according to Nigeria Environmental Impact Assessment Decree 1992, environmental impact assessment is not mandatory for the project category[26] hence environmental analysis is done at the PoA level.

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

The principal environmental impact of the PoA is possible leakage from incandescent light bulbs collected from participating households during the project activities and the mercury contained in CFLs.

To prevent leakage, SSC-CPA implementer will make arrangement for the collection and destruction of replaced incandescent light bulbs. Replaced incandescent light bulbs will be collected, assembled at a central point/warehouse and delivered to a waste disposal agency where they will be destroyed according to applicable environmental norms or as stipulated in the AMS-II.J, version 4 methodology.

Mercury is a constituent of CFLs and is thus an environmental issue to the PoA. CFLs that are used in the project activity will contain a very small quantity of mercury, between 2.5 and 5 milligram per CFL. The mercury content of the CFLs represents some of the smallest on the market today. Mercury is an important component of CFLs and plays a key role in their efficiency, longevity and warm-up times. Mercury is not emitted from lamps when in use, which is why they are safe, both in regard to human health and the environment. However, mercury from used, defective or broken CFLs can be emitted into the environment and become hazardous if they are not properly collected, destroyed or recycled.

To address the above issues, SSC-CPA implementer(s) will make arrangement for the following activities:

- Collect and record details including nameplate and wattage of replaced incandescent light bulbs during CFLs distribution/installation, assemble collected incandescent light bulbs at a central point/warehouse, deliver collected incandescent light bulbs to a waste disposal agency where they will be destroyed according to applicable environmental norms in Nigeria or as stipulated in the AMS-II.J, version 4 methodology.

[26] http://www.nigeria-law.org/Environmental%20Impact%20Assessment%20Decree%20No.%2086%201992.htm

- Establish dedicated centre(s) where residential households taking part in the SSC-CPA can drop-off broken CFLs, and exchange, within the first 12 months following installation, fused/faulty CFLs for new ones, upon producing a valid identification document and residential proof. The identification and residential proof are matched to details on the SSC-CPA database to avoid double counting;

- Inform and educate households in the SSC-CPA through one or more of the following methods: educational and awareness campaign, verbal conversation with participating households, flyers, instruction leaflets/manuals contained in each CFL, of environmental friendly manners of collecting and disposing used, faulty or broken CFLs;

- Employ a qualified third party such as an external auditor(s) to verify the collection of incandescent light bulbs, storage of incandescent light bulbs at a central point/warehouse, delivery of incandescent light bulbs to waste disposal agency(s), destruction and where possible scrapping or recycle of collected incandescent light bulbs;

- Record/report by appointed third party on collection and destruction (where applicable scrapping/recycling) of incandescent light bulbs to be made available for verification by the DOE;

- Recycle of broken, faulty or fused CFLs. Where required by regulation, CFL recycle record/report by appointed third party to be made available for verification by the DOE.

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),:

According to Nigeria Environmental Impact Assessment Decree 1992, (19, 64) the SSC-CPA project type/category is not included in the 'mandatory study list' for which EIA is compulsory[27]

Furthermore, the SSC-CPA will utilise CFL, a technology that is already available to consumer, that has been proven to have no major negative environmental impact and have passed relevant quality standard.

SECTION D. Stakeholders' comments

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

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

[27] http://www.nigeria-law.org/Environmental%20Impact%20Assessment%20Decree%20No.%2086%201992.htm

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:

The initial stakeholder consultation occurred on 5th January 2012 and was attended by stakeholders from different walks of life, representing different groups of people including:

- The common man
- Community Leaders
- Students
- Religious Leaders
- Youth Leaders and NGOs
- Consumer Groups
- Officers of the Law
- Think Tanks and academics from the energy and ecology sectors
- Landfill and Pollution Control Officials – waste disposal and recycling
- Electricity Distribution Companies and Retailers

The Initial Stakeholder Consultation followed the stages below:

- Stakeholders including government agencies, private citizens, community leaders, Think Tanks and NGOs were invited to the consultation via email, phone call and letter.
- The meeting was advertised on 30th December 2011 in a national newspaper - PM News - that distributes locally and nationally.
- Community announcement in schools, local churches and mosques. This method was employed to facilitate the attendance of marginalised group such as local women and youths who may not have access to newspapers, internet or phone.
- Posters inviting people to the local stakeholder meeting appeared throughout communities – Post Office, Town Hall, Schools, Bus Garage
- Non-technical Summary document (in English and local dialect) of the proposed project was distributed to stakeholders well in advance of meetings.
- The initial stakeholder consultation was conducted at public meeting in Ikorodu, Lagos State, Nigeria on 5th January 2012.
- The minutes of the meeting including the report summarising how due account was taken of stakeholders and how the comments (where applicable) have been incorporated into the project design, were mailed to stakeholders and hard copies made available at local libraries and town hall.

D.3. Summary of the comments received:

A summary of comments received during the stakeholder consultation is provided in the Gold Standard stakeholder report, which is available in Annexes 5.

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

All comments received during stakeholder consultation were duly noted and recorded. Issues raised by stakeholders were fully addressed and where relevant incorporated into the PoA. A summary of how due account was taken of stakeholder's comment is provided in the Gold Standard stakeholder report, which is available in Annexes 5.

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:

AMS-II.J, Demand-side activities for efficient lighting technologies, version 4, Sectorial Scope 03, EB 54 is the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA**.**

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

The SSC-CPA meets the requirements of AMS-II.J, version 4 methodology as follows:

AMS-II.J Requirements	SSC-CPA Qualification Justification
AMS-II.J version 4 methodology promotes the adoption of self-ballasted compact fluorescent lamps (CFLs) to replace incandescent lamps (ICLs)	The SSC-CPA will replace energy intensive incandescent light bulbs with energy saving CFLs in residential households connected to the national grid. This will result in substantial demand-side energy savings and carbon dioxide (CO_2) emission reduction.
Under AMS-II.J, the aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year	The aggregate energy savings from a SSC-CPA will not exceed the equivalent of 60 GWh. This is demonstrated in SSC-CPA-DD.
The total lumen output of the CFLs used will be equal to or more than that of the ICL being replaced. Lumen output of ICL & CFL shall be determined in accordance with relevant national or international standard	The lumen output of the project CFLs will be equal or more than the lumen output of incandescent light bulbs being replaced. The lumen output of the project CFLs would be defined according to national or international standard (s) or values in Table 1 of AMS-II.J version 4 methodology.
The rated average life of the CFLs shall be known ex ante. IEC 60969 or an equivalent national standard shall be used to determine the average life.	For the SSC-CPA, The rated average life of the CFLs shall be known ex ante. IEC 60969 or an equivalent national standard shall be used to determine the average life. The project design document shall cite the standard used. If the average life value is not available ex ante, it shall be made available for verification before or at the same time that the results of the second ex post monitoring survey are available for verification. The laboratory conducting and certifying the tests to

	determine CFL average life shall comply with the requirements of a relevant national or international standard.
Unique identification of CFLs	In addition to the standard manufacturer's lamp specifications, CFLs lamps distributed and installed under the SSC-CPA will be legibly and permanently marked with unique identification (such as the name or logo of the coordinating/managing entity)
The project activity will ensure that replaced incandescent light bulbs are exchanged and destroyed and will undertake at least one of the following actions: • Directly installing the CFLs; • Charging at least a minimal price for efficient lighting equipment; • Restricting the number of lamps per household distributed through the project activity to six.	SSC-CPA will exchange incandescent light bulbs for CFLs. SSC-CPA will arrange for destruction of replaced incandescent light bulbs. SSC-CPA will undertake at least one of the following actions: • Directly installing CFLs at each household • Charging at least a minimal price for efficient lighting equipment (i.e. provide CFL at an equivalent price of an incandescent light bulb; • Restricting the number of free (CFLs) lamps per household distributed through the project activity to six. Where direct installation of CFLs is not possible, SSC-CPA implementer shall educate CFL recipients to install CFLs in high usage areas. The methods of education may include verbal education, flyers, leaflets contained in CFL packs, campaign.
Proposed procedures eliminate double counting of emission reductions, for example due to CFL manufacturers, wholesale providers or others possibly claiming credit for Emission Reductions for the project CFLs.	CFL supplier i.e. manufacturer or wholesale providers, SSC-CPA implementer and participating households shall voluntarily enter into an agreement to relinquish their rights over the CERs generated from the project CFLs to the managing/coordinating entity, Icimi Ltd.
The project design document shall explain the proposed method of distribution of efficient lighting equipment and how incandescent light bulbs collection and destruction will be conducted and documented.	The project design document explains the proposed method of distribution as follows: • Direct installation at each household; and/or • Door-to-door distribution to each household (where direct installation is not possible) • CFL distribution via a dedicated distribution points. SSC-CPA implementer(s) shall implement procedures for the storage and destruction of incandescent light bulbs. (refer section E.6.2 and E.7.2)
The CFLs adopted to replace existing equipment must be new equipment and not transferred from another activity	The SSC-CPA will employ self-ballasted (integrated) compact fluorescent lamps (CFLs) to replace incandescent light bulbs in residential households. Project CFLs will be new equipment and will not be transferred from another activity.

NOTE: In 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 CFL installed in households participating in the SSC-CPA, and the electricity grid to which the participating households are connected.

Summary description of the sources and gases included in the SSC-CPA boundary.

	Source	Gas	Included	Justification
Baseline	Power plants serving the electricity grid	CO_2	Yes	Main Emission source.
		CH_4	No	Minor source, deemed negligible.
		N_2O	No	Minor source, deemed negligible.
Project Activity	Power plants serving the electricity grid	CO_2	Yes	Main Emission source.
		CH_4	No	Minor source, deemed negligible.
		N_2O	No	Minor source, deemed negligible.

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

The PoA will cover the geographical boundary of Nigeria. As discussed in section A.4.3, in the absence of the PoA, three alternative baseline scenarios were identified. The three baseline scenarios also apply to the SSC-CPA and are re-introduced below:

- **Scenario 1**

The PoA could be implemented as non-CDM through a government-sponsored programme. Under such initiative, the Federal Government of Nigeria will purchase and distribute CFLs free-of-charge or at a minimal cost (i.e. CFL sold to households at an equivalent price of an incandescent light bulb) to grid connected residential households throughout Nigeria.

This scenario is not applicable as there is no policy or mandated legal requirement at the governmental level in Nigeria for the replacement of incandescent light bulbs with energy saving lights such as CFLs. Furthermore there is no government initiative concern with mass-scale country-wide distribution of CFLs to grid-connected households throughout Nigeria being implemented.

- **Scenario 2**

The second alternative is autonomous replacement of incandescent light bulbs with CFLs by individual households. To achieve the stated goal of the PoA which is a nationwide adoption of energy efficiency lighting (CFLs) at the household level will require a large percentage of the population to individually replace incandescent light bulbs with CFLs by paying the full retail price of $4 or more for a CFL. This scenario is not a credible option due to the prevailing socio-economic

condition in Nigeria where 84% of the population lives on less than $2 a day[28] and 70% of the population lives below the national poverty line[29]. Therefore, autonomous introduction of CFLs at the scale of growth required for a national transformation, which is the goal of the PoA, is not possible.

- **Scenario 3**

The last alternative is the continuation of the current situation whereby grid connected households in Nigeria continue with the current practise of using incandescent light bulbs. This baseline scenario is the only credible alternative in the absence of the PoA.

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:

Here the PPs shall demonstrate, using the procedure provided in the baseline and monitoring methodology applied, additionality of a typical SSC-CPA.

Barrier Analysis is used for the assessment and demonstration of additionality for a typical SSC-CPA. Section A.4.3 (above) describes the barrier at the PoA level. The argument submitted in Section A.4.3 is relevant and applicable to the SSC-CPA. Therefore, the arguments need not be re-written herein to demonstrate additionality of SSC-CPA, except to present a detailed analysis to support investment barrier which may be a key barrier to the SSC-CPA.

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

- The key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA are the barriers and additionality arguments at a PoA level as provided in section A.4.3; and/or
- Investment barrier analysis as indicated in section E.5.1. As per Annex 34 EB 35, a simple cost analysis will be undertaken to demonstrate investment barrier additionality of the SSC-CPA.

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

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

The emission reductions achieved by a typical SSC-CPA will be estimated and measured by application of the options within AMS II.J, Version 4. The equations used to determine the emission reduction are identified in section E.6.2 below.

[28] Source: TradingEconomics.com - World Bank Indicator – Nigeria Poverty Rate: http://www.tradingeconomics.com/nigeria/poverty-headcount-ratio-at-dollar2-a-day-ppp-percent-of-population-wb-data.html

[29] CIA 2007, The World Fact Book: Population Below Poverty Line https://www.cia.gov/library/publications/the-world-factbook/geos/ni.html

The AMS II.J, Version 4 methodological choices are outlined below:

1. **Lumen Output Requirements:**

In accordance with paragraph 2 of AMS-II.J Version 4, the total lumen output of the CFL should be equal to or more than that of the ICL being replaced; lumen output of ICL & CFL shall be determined in accordance with relevant national or international standard/s. Values in Table 1 may be used as an alternative option to such standards. If a lamp wattage is not in Table 1, linearly interpreted value shall be used to determine the minimum light output requirements e.g., 493 Lumens for a 45 W lamp.

The SSC-CPA will adopt the values in Table 1 of AMS-II.J Version 4 to ascertain the lumen equivalence.

Table 1: Light Output Requirements

Baseline Technology - Incandescent Lamp (Watt)	Minimum Light Output (Lumen)
25	230
40	415
50	570
60	715
75	940
90	1,227
100	1,350
150	2,180
200	3,090

2. **CFL Rated Average Life**

In accordance with paragraph 4 of AMS-II.J Version 4, the average life or the rated average life of the CFLs shall be known ex ante. IEC 60969 (Self Ballasted Lamps For General Lighting Services - Performance Requirements) or an equivalent national standard shall be used to determine the average life. The project design document shall cite the standard used. If the average life value is not available ex ante, it shall be made available for verification before or at the same time that the results of the second ex post
monitoring survey, as required per paragraph 18 (b), are available for verification. The laboratory conducting and certifying the tests to determine CFL average life shall comply with the requirements of a relevant national or international standard.

IEC 60969 will be used to determine the rated average life of CFLs for the SSC-CPA. This is because there is no relevant national standard of CFL performance in the project location. If, in future, the host nation adopts a national standard then the project may decide to use the relevant national standard.

3. **Limit undesired secondary market effects**

In accordance with paragraph 7 of AMS-II.J Version 4, the project activity shall be designed to limit undesired secondary market effects (e.g., leakage) and free riders by ensuring that replaced lamps are exchanged and destroyed. Further project participants are required to undertake at least one of the following actions:

(i) Directly installing the CFLs;
(ii) Charging at least a minimal price for efficient lighting equipment(i.e. provide CFL at an equivalent cost of an incandescent light bulb; and/or where a household requires more than four CFLs, additional CFL may be provided at an equivalent cost of an incandescent light bulb);
(iii) Restricting the number of free (CFLs) lamps per household distributed through the project activity to six.

4. **Operating hours of project and baseline lamps**

In accordance with paragraph 11 of AMS-II.J Version 4, operating hours of project (and baseline) lamps will be determined using one of the following two options:

- Option 1: A default value of 3.5 hours per 24 hrs period for 'daily operating hours', i.e., factor Oi in equation 2, is chosen ex ante and is used ex post throughout the crediting period. In this case no surveying to determine Oi is required.
- Option 2: Instead of using a default value of 3.5 hours for O_i, a measured value can be used for the ex ante estimate using the sampling requirements indicated in the definition of Oi for equation (2).

Option 1, a default value of 3.5 hours per 24 hrs period for 'daily operating hours' will be applied to the SSC-CPA.

5. **Technical Grid Losses (TD)**

In accordance with paragraph 12 of AMS-II.J Version 4, 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 10% shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

A default value of 10% shall be used for average annual technical grid losses for the SSC-CPA because recent accurate and reliable data is not available. If, Technical Grid Losses data from the host country becomes available and such data is ascertained to be accurate and reliable, the project may adopt the use of the TD data from the host country.

6. **Net-to-gross adjustment factor**

In accordance with paragraph 12 of AMS-II.J Version 4, Net-to-gross adjustment factor, a default value of 0.95 to be used unless a more appropriate value based on a lighting use survey from the same region and not older than 2 years is available.

Nigeria does not have a lighting use survey therefore the default value of 0.95 is applied to the SSC-CPA.

7. **Ex post monitoring**

To determine the minimum number of ex post monitoring surveys for Lamp Failure Rate (LFRi,y) and where relevant ex post average daily operating hours (Oi), SSC-CPA shall choose either of the following two options:
1. Once every 3 years; or
2. Once for every 30% of the elapsed rated lifetime of the lamp.

Option 1 - once every 3 years will be used for the SSC-CPA. The SSC-CPA may choose to use a more frequent monitoring period than option 1.

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

Emission Reduction

In accordance with AMS-II.J Version 4 methodology, *ex ante* calculations are done as per the following steps:

(i) Estimate the nameplate/rated power (Watts) of the baseline incandescent lamps to be replaced;

(ii) Option 1 – a default value of 3.5 hours is used to determine operating hours of project (and baseline) lamps;

(iii) Calculate the annual gross electricity savings by comparing the nameplate/rated power rating of the CFL with that of the baseline incandescent lamp and multiplying by (i) annual hours of operation and (ii) the estimated number of CFLs that are part of the project. If more than one type (wattage) of CFL is to be used, repeat calculation for each type;

(iv) Calculate the annual net electricity saving (NES), for each year of the assumed crediting period, by correcting the gross electricity savings for leakage, a net-to-gross adjustment (NTG) factor, transmission & distribution losses, and Lamp Failure Rate.

The electricity saved by the project activity in year y is calculated as indicated in equations (1) and (2):

$$NES_y = \sum_{i=1}^{n} Q_{PJ,i} \times (1 - LFR_{i,y}) \times ES_i \times \frac{1}{(1 - TD_y)} \times NTG \quad \textbf{(1)}$$

Where:

$$ES_i = (P_{i,BL} - P_{i,PJ}) \times O_i \times 365 / 1000 \quad \textbf{(2)}$$

Where:

NES_y	Net electricity saved in year y (kWh
QPJ,i	Number (quantity) of pieces of equipment (CFLs) of type i distributed or installed under the project activity (units). In total for all "i", this value shall be equal to or less than the documented number of all baseline incandescent lamps destroyed. Once

	all of the project CFLs are distributed or installed, *QPJ,i* is a constant value independent from y
i	Counter for equipment type
n	Number of types of equipment i
ESi	Estimated annual electricity savings for equipment of type i, for the relevant technology (kWh)
LFRi,y	Lamp Failure Rate for equipment type i in year y (fraction)
TDy	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).
NTG	Net-to-gross adjustment factor, a default value of 0.95 is to be used unless a more appropriate value based on a lighting use survey from the same region and not older than 2 years is available
Pi, BL	Rated power of the baseline lighting devices of the group of "i" lighting devices (Watts)
Pi, PJ	Rated power of the project lighting devices of the group of "i" lighting devices (Watts)
Oi	Average daily operating hours of the lighting devices replaced by the group of "i" lighting devices, use 3.5 hours per 24 hour period as the default value.

Emissions reduction is net electricity savings (NES) times an Emission Factor (EF) calculated in accordance with provisions under AMS-I.D.

$$ER_y = NES_{,y} \times EF_{CO2,ELEC,y} \quad \textbf{(3)}$$

Where:

EFCO2,ELEC,y	Emission Factor in year y calculated in accordance with the provisions in AMS-I.D (tCO2/MWh)
ERy	Emission Reductions in year y (tCO2e)

The Lamp Failure Rate (LFRi,y) is the % of lamps that have failed during a year. The average life or the rated average life is used to calculate the Lamp Failure Rate as follows:

$$\text{If } y * X_i < L_i, \text{ then } LFR_{i,y} = y * X_i * (100 - R_i) / (100 * L_i) \quad \textbf{(4)}$$

$$\text{If } y * X_i > or = L_i, LFR_{i,y} = 1$$

Where:

$LFR_{i,y}$	Lamp Failure Rate for equipment type i in year y (fraction)
L_i	Rated Average Life for equipment type i (hours)
R_i	% of lamps of type i operating at the end of average life or the rated average life (use a value of 50)

X_i	Number of operating hours per year for equipment type i (hours)
y	Counter for year

Emission Factor
As stipulated in paragraph 15 of AMS-II.J version 4, Emission Factor (EF) should be calculated in accordance with provisions under of AMS-I.D. "The tool to calculate the emission factor or an electricity system" version 2.2 (hereforth "Tools") will be used to calculate the parameters.

In order to calculate the C0$_2$ emission factor for the project electricity systems, three parameters will be applied, namely: Operating Margin (OM), Build Margin (BM) and Combined Margin (CM).

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

Step 1. Identify the relevant electric power system
As described by the Tools, a project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints.

National Grid of Nigeria is identified as connected electricity system for grid emission factor estimation. The SSC-CFA will distribute CFLs to households serve by the Nigerian national electricity grid.

Step 2. Choose whether to include off-grid power plants in the project electricity system
Option I: Only grid power plants are included in the calculation of the operating margin and build margin emission factors. The SSC-CPA will distribute CFLs to households that are served by the national grid.

Step 3. Select a method to determine the operating margin (OM)
The Tool provided four options that can be used to determine the operating margin. The Simple OM **(Option A)** method will apply to the SSC-CPA because low-cost/must-run resources constitute less than 50% of total grid generation in the five most recent years. Hydro makes up 31% of the total grid generation in the last five years, as shown in the table below[30].

For the simple OM, the emissions factor can be calculated using either the EX ante option or the Ex post option. According to the Tool, if the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation. For off-grid power
plants, use a single calendar year within the 5 most recent calendar years prior to the time of submission

[30] Source: Annual Technical Report 2004-2008, National Control Centre Osogbo, PHCN

of the CDM-PDD for validation.

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

For Simple OM emission factor calculation, Ex ante option is selected and 3-year generation-weighted average is applied.

Table: Power plant-wise electricity generation from 2004 to 2008

Power plant Type	Power plant Name	Generation (MWh)					Total (MWh)
		2004	2005	**2006**	**2007**	**2008**	
Hydro	KAINJI	2,878,774	2,586,929	2,366,716	2,816,750	2,707,020	13,356,190
	JEBBA	2,703,750	2,268,230	2,171,747	2,728,899	2,794,976	12,667,602
	SHIRORO	2,425,575	1,236,090	2,432,640	2,230,761	1,941,344	10,266,410
	NESCO*						
Thermal	EGBIN	7,962,764	8,592,097	4,924,478	3,636,680	4,381,564	29,497,584
	SAPELE	1,025,568	878,417	185,079	490,790	728,977	3,308,831
	AFAM	1,247,813	1,838,934	1,864,110	1,274,103	312,272	6,537,232
	DELTA	3,933,785	3,235,212	3,752,054	2,696,719	1,510,988	15,128,758
	AES	1,953,276	2,018,364	1,966,492	1,675,496	1,846,702	9,460,330
	CALABAR	936	202	-	-	-	1,138
	AGGREKO	1,409	-	-	-	-	1,409
	GEOMETRIC	1,060	-	-	-	-	1,060
	OKPAI	-	1,343,611	3,267,430	3,294,207	2,708,671	10,613,919
	AJAOKUTA	-	80,597	356,452	572,517	30,344	1,039,910
	OMOKU	-	-	12,282	429,268	297,580	739,130
	OMOTOSHO	-	-	-	146,801	491,852	638,653
	GEREGU	-	-	-	1,193,553	995,875	2,189,427
	OLORUNSGO	-	-	-	-	418,546	418,546
	AFAM6	-	-	-	-	142,389	142,389

Total Generation (2004-2008) - MWh	116,008,516
Generation from Hydro (2004-2008) - MWh	36.290,202
Generation from Other Sources(2004-2008) MWH	79,718,314
Share of Hydro (%)	31%
Share of Other Sources (%)	69%

*Data from NESCO Power Plant is not considered as it operates as an isolated system.

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

The simple OM emission factor is calculated using Option B. The data vintage option selected is the ex-ante approach.

Option B is selected to calculate the simple OM due to the following reasons:

- CO2 emission factor for each unit of the power plant as required by Option A is not available.
- Only renewable power generation (hydro) is considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known.
- Off-grid power plants are not included in the calculation.

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

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

Where:

Parameter	Details
$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year y tCO_2/MWh
$FC_{i,y}$	Amount of fossil fuel type i consumed by plant/unit m in year y (mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in the year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	CO2 emission factor of fossil fuel type i, in the year y (tCO2/GJ)
$EG_{,,y}$	Net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units in year y (MWh)
i	All fossil fuel types combusted in power sources in the project electricity system in year y
y	The relevant year as per the data vintage chosen in Step 3

In accordance to the Tool, in the project activity, (ex-ante) the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission has been considered. The data vintage option selected is the ex-ante approach. The 3-year generation-weighted average is calculated from 2006-2008. A detailed calculation of the simple OM using option B is shown below. *The inputs and conversion data used to calculate the emission are provided in Annex 6.*

Table: Power plant-wise fuel consumption (2006-2008)

Fuel Type	Power plant Name	Fuel Consumption for electricity generation 2006-2008 (MMSCF/Year for NG, Tonnes/Year for Diesel, and no fuel consumption for Hydro)		
		2006	2007	2008
	KAINJI	0	0	0
	JEBBA	0	0	0
	SHIRORO	0	0	0
HYDRO	NESCO *			
	EGBIN	50523	35601	47875
	SAPELE	2631	7398	7675
	AFAM	24732	17935	4749
	DELTA	48004	38216	21058
	AES	24909	20709	23920
	CALABAR	0	0	0
GAS	AGGREKO	0	0	0
DIESEL	GEOMETRIC	0	0	0
	OKPAI	NA	NA	NA
	AJAOKUTA	NA	NA	NA
	OMOKU	NA	NA	NA
	OMOTOSHO	0	1393	5508
	GEREGU	0	10593	11476
	OLORUNSGO	0	0	4638
GAS	AFAM6	0	0	NA

*** Data from NESCO Power Plant is not considered as it operates as an isolated system**

NA : Data on fuel consumption was not available.

Table: Calculation of Operating Margin Emission Factor (2006 - 2008)

Plant name	Plant wise Emissions (tCO2/Year)		
	2006	2007	2008
KAINJI	-	-	-
JEBBA	-	-	-
SHIRORO	-	-	-
NESCO *			
EGBIN	3,080,149	2,170,439	2,918,687
SAPELE	160,376	450,992	467,934
AFAM	1,507,810	1,093,380	289,527
DELTA	2,926,584	2,329,860	1,283,796
AES	1,518,587	1,262,513	1,458,297
CALABAR	-	-	-
AGGREKO	-	-	-
GEOMETRIC	-	-	-
OKPAI	1,670,608	1,684,299	1,384,919
AJAOKUTA	182,251	292,723	15,515
OMOKU	6,280	219,481	152,150
OMOTOSHO	-	84,903	335,792
GEREGU	-	645,822	699,621
OLORUNSGO	-	-	282,776
AFAM6	-	-	72,802
Total Emissions (tCO2) - 2006			11,052,644
Total Emissions (tCO2) - 2007			10,234,411
Total Emissions (tCO2) - 2008			9,361,816
Total Electricity Generated (MWh) - 2006			16,328,377
Total Electricity Generated (MWh) - 2007			15,410,133
Total Electricity Generated (MWh) - 2008			13,865,759
Emission Factor (tCO2/MWh)-2006			0.68
Emission Factor (tCO2/MWh)-2007			0.66
Emission Factor (tCO2/MWh)-2008			0.68

Average OM EF (tCO2/MWh)	0.67

*** Data from NESCO Power Plant is not considered as it operates as an isolated system**

Step 5. Calculate the build margin emission factor

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

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

follows:

Where:

Parameter	Details
$EF_{grid,BM,y}$	Build margin CO_2 emission factor in the year y, (tCO2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO2 emission factor of power unit m in the year y, (tCO2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

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

(a) Identify the set of five power units, excluding power units registered as CDM project activities,
that started to supply electricity to the grid most recently and determine their annual electricity generation.

(b) Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of annual electricity generation total. Determine their annual electricity generation.

(c) Select the set of power units that comprises the larger annual generation.

The Build Margin (BM) emission factor is calculated ex-ante using the set of 7 power units (highlighted in the table below) that were built most recently and that represents 20% of the system generation. The 7 power units are chosen because the electricity generated from the set of five power units built most recently accounts for only 11% of the total generation in the system during 2008, the year selected for the build margin calculation. Likewise, electricity generation from the six power plants that are built most recently constitutes only 11.2%. Conversely, electricity generation from seven power plants built most recently represents 23.9% of the total generation, which is consistent with the 20% benchmark required by the Tool to select the build margin power plants.

Power plants included the calculation of Build Margin (BM)

Plant Name	Installed Capacity of Power Plants (MW)	Electricity generation (MWh) in 2008	Year of Commissioning
KAINJI	760	2,707,020	
JEBBA	578.4	2,794,976	
SHIRORO	600	1,941,344	
NESCO *	-	-	
EGBIN	1320	4,381,564	
SAPELE	1020	728,977	
AFAM	931.6	312,272	
DELTA	882	1,510,988	
AES	302	1,846,702	
CALABAR		-	
AGGREKO		-	
GEOMETRIC		-	
OKPAI	450	2,708,671	
AJAOKUTA	110	30,344	
OMOKU		297,580	2006
OMOTOSHO	335	491,852	2007
GEREGU	414	995,875	2007
OLORUNSGO	335	418,546	2007
AFAM6	331.5	142,389	2008
Annual Electricity Generation **(AEG_{total}, in MWh)**		21,309,099	
Annual Electricity Generation in 5 newly built plants **($AEG_{SET-5-units}$, in MWh)**		2,346,242	
Share of 5 newly built plans in the annual electricity generation (%)		11.0%	
Annual Electricity Generation in 6 newly built plants **($AEG_{SET-\geq 20\%}$, in MWh)**		2,376,586	
Share of 6 newly built plans in the annual electricity generation (%)		11.2%	
Annual Electricity Generation in 7 newly built plants **($AEG_{SET-\geq 20\%}$, in MWh)**		5,085,257	
Share of 7 newly built plans in the annual electricity generation (%)		23.9%	

- **Data from NESCO Power Plant is not considered it operates as an isolated system**

According to the guidelines set out in the Tool, wherever fuel consumption data was not available, the emission factor of those power plants is calculated using the following formula: Option B2 is used to determine the CO2 emission factor of each power unit m (EFEL,m,y) as per the guidance in Step 4 (a) for the simple OM. The option is applied due to limited available data

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} x 3.6}{\eta_{m,y}}$$

Where:

Parameter	Details
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO2/MWh)
$EF_{CO2,m,i,y}$	Average CO2 emission factor of fuel type i used in power unit m in year y (tCO2/GJ)
$\eta_{m,y}$	Average net energy conversion efficiency of power unit m in year y (ratio)
m	All power units serving the grid in year y except low-cost/must-run power units
i	All fossil fuel types combusted in power plant/unit m in year y
y	The relevant year as per the data vintage chosen in Step 3

The CO2 emission factor of each power unit m (EFEL,m,y) is determined for year y using the most recent historical year for which power generation data is available, and using for m the power units included in the build margin as follows:

Table: Build Margin Calculations

Power plant name	Gas consumed	Electricity	EF(el,m,y)	EF BM
	MMSCF	MWh	tCO2/MWh	tCO2/MWh
OKPAI	NA	2,708,671	0.51	0.58
AJAOKUTA	NA	30,344	0.51	
OMOKU	NA	297,580	0.51	
OMOTOSHO	5,508	491,852	0.68	
GEREGU	11,476	995,875	0.70	
OLORUNSGO	4,638	418,546	0.68	
AFAM6	NA	142,389	0.51	

- **Detailed Calculation provided in Annex 10**

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

The calculation of the combined margin (CM) emission factor (EFgrid,CM,y) is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

Option A, The weighted average CM method is used to calculate the combined margin (CM) emissions factor. The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

Where:

Parameter	Details
$EF_{BM,y}$	Build Margin CO2 emission factor in the year y (tCO2/GWh)
$EF_{OM,y}$	Operating Margin CO2 emission factor in the year y (tCO2/GWh)
W_{OM}	Weighting of operating margin emission factor (%)
W_{BM}	Weighting of build margin emission factor (%)

The baseline emission factor for power projects in year y is calculated as the sum of 50% weightage of OM and 50% weightage of BM emission factor. The resulting Combined Margin is fixed ex ante until the renewal of the PoA crediting period at which point the Emission Factor will be revised.

Table: Combined Margin Emission Factor

Operating Margin EF	tCO2/MWh	0.67
Build Margin EF	tCO2/MWh	0.58
Weightage for OM (W1)	%	50%
Weightage for BM (W2)	%	50%
Combined Margin EF (EF CM)	tCO2/MWh	0.63

A combined margin emission factor 0.63 tCO2/MWh will be used for the PoA, until the renewal of the PoA crediting period is undertaken at which point the Emission Factor will be revised.

***Ex post* monitoring surveys**

Ex post monitoring surveys are required to be conducted to adjust the net electricity savings considering the actual lamp failure data. In accordance with paragraph 17 of AMS-II.J Version 4 methodology, the following ex post monitoring shall apply:

First ex post monitoring survey, will be carried out within the first year after installation of all efficient lighting equipment to provide a value for the number of CFLs placed in service and operating under the project activity. The results of this survey will be used to determine the quantity of CFLs (QPJ,i) in the Emission Reduction calculation to determine the ex post Lamp Failure Rate (LFRi,y) for use in ex post Emission Reduction calculations.

Subsequent ex post monitoring surveys will be carried out once every 3 years to determine the ex post Lamp Failure Rate (LFRi,y) for use in ex post Emission Reduction calculations until such time as CERs are being requested.

The monitoring surveys will consist of identifying CFLs, marked with unique identification (as per paragraph 6), that are installed and operating. Only CFLs with an original marking can be counted as installed. While CFLs replaced as part of a regular maintenance or warranty program can be counted as operating, cannot be replaced as part of this monitoring survey process and counted as operating for the purposes of determining $QPJ_{,i}$

Changes to lamp failure rate ($LFR_{i,y}$)

The Net Electricity Savings shall be modified for changes to the Lamp Failure Rate as may be indicated by ex post monitoring survey results and/or on the basis of CFL Average Life values if a CFL Rated Average Life was used initially. The modifications shall be made using the following methods:

1. If Rated Average Life values were used initially for calculating LFR_y, per equation (4), as soon as Average Life values are available they shall be used for calculation of subsequent year $LFR_{i,y}$ values.

2. If the ex post monitoring surveys indicate that the failure rate is equal to or less than the $LFR_{i,y}$ value indicated using equation (4) with ex ante or prior year, ex post monitoring values, for subsequent years $LFR_{i,y}$ shall continue to be determined using Equation (4) and the established Average Life values for L_i.

3. However, for subsequent years, L_i values in $LFR_{i,y}$ equation (4) shall be adjusted if the ex post monitoring surveys indicate that the failure rate ($LFR_{i,y}$) is greater than the value indicated using equation (4) with Average Life or prior year, ex post monitoring values. In this situation, a new value for L_i shall be determined using equation (4) and new values of $LFR_{i,y}$ shall be used beginning from the first calculation year after completion of the ex post survey.

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

Data / Parameter:	**$Q_{PJ,i}$**
Data unit:	Number
Description:	Number of CFLs distributed/installed under the project activity
Source of data used:	Determined by the SSC-CPA database
Value applied:	Estimated in the region of 600,000 to 1,000,000
Justification of the choice of data or description of measurement methods and procedures actually applied :	The exact number of CFL that is distributed ex post will be based on the actual value recorded in the SSC-CPA database.
Any comment:	The number of CFLs distributed to households shall be equal to or less than the documented number of all baseline incandescent lamp destroyed.

Data / Parameter:	**NES_y**
Data unit:	kWh
Description:	Net electricity saved in year *y*
Source of data used:	Result of calculation using the equation in paragraph 12, AMS-II.J version 4 methodology
Value applied:	Net of electricity saved by the project in year *y* ascertained by the calculation using the equation in paragraph 12, AMS-II.J version 4 methodology
Justification of the choice of data or description of measurement methods	In accordance with Methodology AMS-II.J version 4

and procedures actually applied :	
Any comment:	-

Data / Parameter:	**ER_y**
Data unit:	tCO2e
Description:	Emission reductions in year y
Source of data used:	Result of calculation using the equation in paragraph 15, AMS-II.J version 4 methodology
Value applied:	Depends on result of calculation using the equation in paragraph 15, AMS-II.J version 4 methodology
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with AMS-II.J version 4 methodology
Any comment:	-

Data / Parameter:	**O_i**
Data unit:	Hours per day
Description:	Average daily operating hours of incandescent light bulbs replaced
Source of data used:	A default value prescribed by methodology AMS-II.J version 4
Value applied:	3.5 hours per 24 hrs period
Justification of the choice of data or description of measurement methods and procedures actually applied :	A default value in accordance with AMS-II.J version 4
Any comment:	-

Data / Parameter:	**NTG**
Data unit:	-
Description:	Net-to-gross adjustment factor
Source of data used:	Methodology AMS-II.J version 4
Value applied:	0.95
Justification of the choice of data or description of measurement methods and procedures actually applied :	A default value in accordance with AMS-II.J version 4
Any comment:	-

Data / Parameter:	**ES_i**
Data unit:	kWh
Description:	Estimated annual electricity savings for equipment type i, for the relevant technology
Source of data used:	Result of calculation using the equation in paragraph 12, AMS-II.J version 4 methodology
Value applied:	Depends on result of calculation using the equation in paragraph 12, AMS-II.J version 4 methodology
Justification of the choice of data or description of measurement methods and procedures actually applied :	In accordance with Methodology AMS-II.J version 4
Any comment:	-

Data / Parameter:	**$LFR_{i,y}$**
Data unit:	Number
Description:	% of lamp failure rate for equipment type *i* in year *y*
Source of data used:	Ex ante figure calculated using the equation in paragraph 14 of AMS-II.J version 4 methodology *EX post* figure will be derived from *ex post* monitoring survey
Value applied:	Depends on the result of the calculation using the equation in paragraph 14, AMS-II.J version 4 methodology, and the outcome of *ex post* monitoring surveys
Justification of the choice of data or description of measurement methods and procedures actually applied :	The ex-ante LFR calculated value is corrected as per the *ex post* monitoring survey as follows: If the ex post monitoring surveys indicate that the failure rate is equal to or less than the LFRi,y value for subsequent years LFRi,y shall continue to be determined using Equation (4), above. However, for subsequent years, Li values in LFRi,y equation in paragraph 14, AMS-II.J version 4 shall be adjusted if the ex post monitoring surveys indicate that the failure rate (LFRi,y) is greater than the value indicated using the equation in paragraph 14, AMS-II.J version with Average Life or prior year, ex post monitoring values. In this situation, a new value for Li shall be determined using the equation in paragraph 14, AMS-II.J version 4 and new values of LFRi,y shall be used beginning from the first calculation year after completion of the *ex post* survey.
Any comment:	-

Data / Parameter:	**$P_{i,BL}$**
Data unit:	Watts
Description:	Rated power of the baseline ICLs of the group of "i"
Source of data used:	SSC-CPA database
Value applied:	Rated power of the baseline ICLs replaced, determined from SSC-CPA database

Justification of the choice of data or description of measurement methods and procedures actually applied :	Project implementer will formulate and maintain a standardized data recording formats and SSC-CPA database approved by the coordinating/managing entity, for the SSC-CPA. The data will include watts of baseline ICLs replaced and will be part of SSC-CPA implementer record keeping. Ex post: Actual watts of ICL replaced will be based on the actual value recorded in the SSC-CPA database.
Any comment:	-

Data / Parameter:	$P_{i, PJ}$
Data unit:	Watts
Description:	Rated power of the project CFLs of the group of "i"
Source of data used:	SSC-CPA database
Value applied:	Rated power of the project CFLs distributed/installed, determined from SSC-CPA database
Justification of the choice of data or description of measurement methods and procedures actually applied :	Project implementer will formulate and maintain a standardized data recording formats and SSC-CPA database approved by the coordinating/managing entity, for the SSC-CPA. The data will include watts of project CFLs distributed/installed and will be part of SSC-CPA implementer record keeping. Ex post: Actual watts of CFL distributed/installed will be based on the actual value recorded in the SSC-CPA database.
Any comment:	-

Data / Parameter:	TD_y
Data unit:	Number
Description:	Average annual technical grid losses.
Source of data used:	AMS-II-J version 4 guideline
Value applied:	10%
Justification of the choice of data or description of measurement methods and procedures actually applied :	The transmission and distribution losses data from host country cannot be ascertained with accuracy, thus the default value of 0.1, is used as the grid losses, in accordance with the AMS-II.J version 4 methodology.
Any comment:	If Technical Grid Losses data from the host country becomes available and such data is ascertained to be accurate and reliable, the project may adopt the use of the **TD** data from the host country.

Data / Parameter:	$EF_{CO2,ELEC,y}$
Data unit:	tCO2/MWh
Description:	The emission factor for the electricity displaced from the grid serving the CPA households, calculated in accordance with AMS-I.D version 17.
Source of data used:	Calculations shall be based on data from an official source (where available) and made publicly available.
Value applied:	0.63
Justification of the	Data is calculated using the methodology: "Tool to calculate the emission factor

choice of data or description of measurement methods and procedures actually applied :	for an electricity system" version to 2.2
Any comment:	-

Data / Parameter:	**L_i**
Data unit:	Hours
Description:	Rated average life for equipment type *i* (hours)
Source of data used:	CFL manufacturer/supplier in compliance with IEC 60969 or an equivalent national standard
Value applied:	Base on the rated average life value supplied by CFL manufacturer/supplier
Justification of the choice of data or description of measurement methods and procedures actually applied :	Determined as per the independent life-tests of the CFLs as per national or international standard
Any comment:	-

Data / Parameter:	**X_i**
Data unit:	Hours
Description:	Number of operating hours per year for equipment type i
Source of data used:	Derived from calculation: 3.5hrs (default value) * 365days (366 days for leap yr)
Value applied:	1277.5
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value of 3.5 hours of CFL daily operating hours, based on option 1 of paragraph 11, AMS-II.J version 4 methodology.
Any comment:	-

Data / Parameter:	**R_i**
Data unit:	Number
Description:	% of lamps of type *i* operating at the end of rated average life (of CFL)
Source of data used:	AMS-II.J version 4
Value applied:	50%
Justification of the choice of data or description of measurement methods and procedures actually applied :	Default value is consistent with AMS-II.J version 4 Methodology

Any comment:	-

Data / Parameter:	**y**
Data unit:	Number
Description:	Counter for year
Source of data used:	As per SSC-CPA database
Value applied:	Determined as a yearly figure from the SSC-CPA database
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SSC-CPA database will contain the counter for year number
Any comment:	-

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

E.7.1. Data and parameters to be monitored by each SSC-CPA:	
Data / Parameter:	***Lamp Distribution Data***
Data unit:	-
Description:	**Data to be monitored** • The start and completion date of CFL distribution, • The physical geographic location of each CFL distributed and installed • Unambiguous identification of the recipient of the CFLs including name, address and unique identification such as NEPA/PCHN/Official electricity folio number of CFL recipient. • Signature of CFL recipient
Source of data to be used:	SSC-CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	• SSC-CPA Implementer will formulate and use a standardized data format and SSC-CPA database approved by the managing entity to record lamp distribution data for the SSC-CPA. • SSC-CPA Implementer will collect lamp distribution data - dates, physical location, name and address of recipient, electricity folio number (if applicable) during CFL distribution/installation • Signature of CFL recipient • SSC_CPA Implementer will record and store lamp distribution data in the SSC-CPA SSC-CPA database. • SSC-CPA implementer will carry out regular Quality Assurance Check

	on SSC-CPA database.
QA/QC procedures to be applied:	• The PoA database will duplicate and store SSC-CPA record keeping data for the SSC_CPA • PoA database will be fully backed and managed by the coordinating/managing entity. • Lamp distribution data will be verified by DOE
Any comment:	-

Data / Parameter:	$\mathbf{P_{i,BL}}$
Data unit:	Watts
Description:	Nameplate and wattage of each incandescent light bulb replaced during the SSC-CPA.
Source of data to be used:	SSC-CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	**N/A**
Description of measurement methods and procedures to be applied:	• SSC_CPA implementer will formulate and use a standardized data format and SSC-CPA database approved by the managing entity to record the nameplates and wattage of incandescent light bulbs replaced. • SSC_CPA implementer will collect nameplate and wattage data on incandescent light bulbs replaced from households during CFL distribution/installation • SSC_CPA implementer will record and store ICL nameplate and wattage data in the SSC-CPA database • SSC-CPA implementer will carry out regular Quality Assurance Check on SSC-CPA database
QA/QC procedures to be applied:	• The PoA database will duplicate and store record keeping data for the SSC_CPA • PoA database will be fully backed and managed by the coordinating/managing entity. • $\mathbf{P_{i,BL}}$ data will be verified by DOE
Any comment:	-

Data / Parameter:	$\mathbf{P_{i,PJ}}$
Data unit:	Watts
Description:	Nameplate and wattage of each CFL distributed/installed during the SSC-CPA.
Source of data to be used:	SSC-CPA database
Value of data applied for the purpose of	N/A

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	• SSC_CPA implementer will formulate and use a standardized data format and SSC-CPA database approved by the managing entity to record the nameplates and wattage of CFLs distributed/installed from project households • SSC_CPA implementer will collect nameplate and wattage data on CFL distributed/installed from households during CFL distribution/installation • SSC_CPA Implementer will record CFL nameplate and wattage data in the SSC-CPA database • SSC-CPA implementer will carry out regular Quality Assurance Check on SSC-CPA database.
QA/QC procedures to be applied:	• The PoA database will duplicate and store record keeping data for the SSC_CPA • PoA database will be fully backed and managed by the coordinating/managing entity • $\mathbf{P_{i,PJ}}$ data will be verified by DOE
Any comment:	

Data / Parameter:	$\mathbf{Q_{PJ}}$
Data unit:	Number
Description:	Number of pieces of CFL distributed /installed
Source of data to be used:	SSC-CPA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	The number of CFLs recorded for the SSC-CPA will be used to calculate the electricity saved by the project activity NES_y
Description of measurement methods and procedures to be applied:	• SSC_CPA implementer will formulate and use a standardized data format and SSC-CPA approved by the managing entity to record the number of CFLs distributed/installed from project households in the SSC-CPA • SSC_CPA implementer will collect the number of CFL distributed/installed in each project households during CFL distribution/installation • SSC_CPA Implementer will record the number of CFL distributed/installed in the SSC-CPA database • SSC-CPA implementer will carry out regular Quality Assurance Check on SSC-CPA database.
QA/QC procedures to be applied:	• The PoA database will duplicate and store record keeping data for the SSC_CPA • PoA database will be fully backed and managed by the coordinating/managing entity Distributed/installed CFL data will be verifiable by DOE
Any comment:	

Data / Parameter:	**LFR**
Data unit:	Number
Description:	Lamp Failure Rate for CFL type *i* in year y
Source of data to be used:	Ex-post Monitoring survey
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Result of Lamp Failure Rate from *ex post* monitoring survey is used to calculate electricity saved by the project activity *(NES)*
Description of measurement methods and procedures to be applied:	Survey of Lamp Failure Rate will be carried out according to paragraph 20, AMS-II.J version 4
QA/QC procedures to be applied:	SSC-CPA will contract a qualified third party firm to carry out survey of Lamp Failure Rate.
Any comment:	-

Data / Parameter:	***Project Emission reductions***
Data unit:	tCO2e
Description:	Emission reductions attributable to each monitoring period
Source of data to be used:	PoA database
Value of data applied for the purpose of calculating expected emission reductions in section B.5	N/A
Description of measurement methods and procedures to be applied:	Application of AMSII.J/Version 4
QA/QC procedures to be applied:	• The PoA database will duplicate and store record keeping data for the SSC_CPA • Project database will be fully backed and managed by the coordinating/managing entity • Emission reduction data will be verified by DOE
Any comment:	-

Data / Parameter:	$N_{Destroyed}$
Data unit:	Number
Description:	Number of ICLs collected and destroyed
Source of data to be used:	SSC-CPA database

Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be filled by SSC-CPA. Once determined, the value is fixed and applied throughout the crediting period.
Description of measurement methods and procedures to be applied:	ICL collection and destruction data is entered into the SSC-CPA database
QA/QC procedures to be applied:	Qualified third party(s) to carry out random verification of the collection and destruction of ICLs. Record/report of qualified third party (s) on the collection and destruction of ICLs to be verifiable by DOE
Any comment:	

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

The project activity will abide by the monitoring guidelines of AMS-II.J version 4 through the implementation of the following monitoring plans:

Record Keeping and SSC-CPA Database

Recording of Lamp distribution data shall entails the following:

- SSC-CPA implementer will formulate and maintain a standardized data recording formats and SSC-CPA database approved by the coordinating/managing entity, to maintain appropriate records on lamp distribution. SSC-CPA implementer will document the following variables inter-alia:
    - The physical geographic location of each CFL distributed and installed;
    - Number of pieces of CFL distributed/installed and date of distribution/installation;
    - Number of pieces of incandescent light bulbs replaced and date replacement took place;
    - The specifications i.e nameplate and rated power of incandescent light bulbs exchanged and CFLs distributed and installed at households participating in the CPA;
    - Unambiguous identification including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFLs recipient;
    - Signature of CFL recipients that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.

CFL Distribution

CFL distribution will be carried out by SSC-CPA implementer with the support of coordinating/managing entity, Icimi Ltd

- SSC-CPA implementer shall directly install CFLs at households and collect incandescent light bulbs replaced during installation; and/or
- Distribute CFLs door-to-door (where direct installation is not possible) and collect incandescent light bulbs at the time of distribution;

- CFL distribution and incandescent light bulbs collection can take place via a dedicated distribution point advertised in the local media by SSC-CPA implementer;
- SSC-CPA implementer shall educate CFL recipients to install CFLs in high usage areas. The methods of education may include one or more of the following: verbal education, flyers, campaign, leaflets/manual contained in CFL packs;
- During CFL distribution/installation, SSC-CPA implementer will use the formulated standardized data recording formats to record CFL distribution data, including: name, address, signature, dates, nameplate, watts, number of device distributed/installed and exchanged/replaced..
- SSC-CPA implementer will record and store CFL distribution data recorded during CFL distribution/installation in the SSC-CPA database. The SSC-CPA database will be maintained by the SSC-CPA implementer.
- After CFLs distribution/installation has been completed for the SSC-CPA, the SSC-CPA implementer will perform the following quality and assurance checks after notifying the coordinating/managing entity of end-date of CFL distribution/installation but before CFL distribution data contained in the SSC-CPA database is electronically submitted to the coordinating/managing entity:
    - Reconciliation of the number of CFLs and incandescent light bulbs distributed/installed and replaced. The total number of CFLs that are eligible for calculating emission reductions for the monitoring interval *y* should be less than or equal to the number of incandescent light bulbs replaced at the start of the project activity.
    - Perform a simple random sample of 100 households that received CFLs, ensuring accuracy of distribution data recorded for the sample households, based on 90% confidence interval. Any discrepancy should be investigated and corrected by SSC-CPA implementer.
    - The results of reconciliation exercise and sample survey should be submitted to the coordinating/managing entity for verification.
    - The accuracy of the sample households' CFL distribution data will declare the end date effective by the coordinating/managing entity; at which point, the SSC-CPA database is electronically submitted to the coordinating/managing entity.
    - If there is any discrepancy in the sample household survey, SSC-CPA implementer will correct issue/error before submitting CFL distribution data to the coordinating/managing entity.

***Ex post* monitoring surveys**

Ex post monitoring surveys shall follow the guideline described in Appendix 4 and outlined below:

- Simple random sampling method will be used for the ex post monitoring survey. Under this method, sample households are chosen entirely by chance from the SSC-CPA database;
- Sample Frame is the SSC-CPA database list of all households that receive CFLs from the SSC-CPA;
- The sample size is 100; the confidence interval is 90% and the minimum error margin is 10%;
- SSC-CPA will collect and collate ex post monitoring survey data as follows:
    - Survey will be carried out through site visits to 100 sample households that have been randomly selected from the SSC-CPA database: Does sample household being visited unique SSC-CPA number matches one of 100 randomly selected households? **[Yes] [No]**

- Sample data will be collected on only installed CFLs with an original marking (coordinating/managing entity's logo/name or unique identification details). Only those CFLs can be counted as installed: Does installed CFL(s) in sample household have coordinating/managing entity's logo/name or unique identification? **[Yes] [No]**

- Are installed CFLs in sample household operational? **[Yes] [No]**

- Is the person (s) interviewed for the survey confirmed to be over 12 years old? **[Yes] [No]**

- Where SSC-CPA's target population can be demonstrated to be homogenous (e.g. multiple CPAs in one geographic and/or socio-economic population) SSC-CPAs will be clustered together and one representative ex post monitoring survey conducted to satisfy monitoring requirements across like SSC-CPAs.

PoA Programme Database

The coordinating entity will establish a secure, well-defined and adequate data management system. The PoA database will record, store, monitor and secure all information relevant to the SSC-PoA and each SSC-CPAs undertaken as part of the PoA. The PoA database will be fully backed.

The PoA database will record the start and end dates of each monitoring period and the emission reduction attributable to the monitoring period per SSC-CPA. The monitoring plan is designed to eliminate risk of double-counting between SSC-CPAs. Therefore rigorous record keeping procedures that include mutually exclusive dataset per SSC-CPA would be implemented to ensure that each monitoring period dataset can be transparently attributed to its corresponding SSC-CPA in order to prevent occurrence of double counting.

The project database will include the following data-set for each SSC-CPA:

- The physical geographic location of SSC-CPA;
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date replacement took place;
- The specifications i.e. nameplate and rated power of incandescent light bulbs exchanged and CFLs; distributed and installed in households participating in the CPA;
- Unambiguous identification, including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFLs recipient;
- Record of signature of CFL recipients that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.
- Verification records including number of incandescent light bulbs destroyed and date of destruction
- CFL purchase and dispatch records, to prevent double counting.
- Lamp failure rates, determined by the ex post monitoring survey representing that CPA for each monitoring period.

Incandescent Light Bulbs Destruction and Verification

SSC-CPA implementer will arrange for the following activities to be carried out:

- Collect replaced incandescent light bulbs at the time of CFL installation, during Door-to-door distribution to each household and at distribution point advertised in the local media by SSC-CPA implementer;
- Record details including nameplate and wattage of incandescent light bulbs collected
- Assemble replaced incandescent light bulbs collected during CFL installation/distribution at a central point/warehouse;
- Determine/count the number of incandescent light bulbs collected including nameplate and wattage. Although, due to the large number of incandescent light bulbs, individual counting may be impossible;
- Deliver collected incandescent light bulbs to waste disposal agency(s) where they will be destroyed according to applicable environmental norms or as stipulated in the AMS-II.J, version 4 methodology;
- Commission qualified third party(s) to carry out periodic audit to independently verify the destruction and if applicable scrapping/recycle of incandescent light bulbs collected during the SSC-CPA;
- Qualified third party(s) pay random visit(s) to the central point/warehouse where incandescent light bulbs are assembled prior to delivery to waste disposal agency(s), to ensure that collection and storage of incandescent bulbs are correct and consistent with applicable environmental norms. Although, due to the large number of incandescent light bulbs, individual counting may be impossible;
- Qualified third party(s) pay random visit(s) to waste disposal agencies/sanitary landfill to verify the destruction and if applicable scrapping/recycle of incandescent light bulbs follow environmentally acceptable norms;
- Qualified third party(s) will record/report on the collection, storage, destruction and if applicable, scrapping/recycle of incandescent light bulbs, to demonstrate compliance with monitoring requirements. The record/report will be available to DOE for verification.

CFL Destruction and Verification

SSC-CPA implementer will arrange for the following activities to be carried out:

- Compile and update record of the number of broken, faulty or fused project CFLs, at the established drop-off centre(s);
- Deliver collected CFL to waste disposal agency(s) for recycling. If recycle is not applicable or recycling facilities is not available at SSC-CPA location, CFLs should be destroyed according to the applicable national environmental norms;
- Commission qualified third party(s) to independently verify the recycle/destruction of broken, faulty or fused CFLs collected during the SSC-CPA.
- Qualified third party(s) pay random visit(s) to waste disposal agency(s) to verify recycle/destruction of broken, faulty or fused CFLs.
- Where required by regulation, qualified third party(s) record/report on recycle/destruction of broken, faulty or fused CFLs to demonstrate compliance with monitoring requirements. The record/report will be available to DOE for verification.

Defined Roles & Responsibilities of Coordinating/managing entity and SSC-CPA Implementer

Icimi ltd, as coordinating and managing entity, shall:

- Coordinate and manage the PoA
- Develop Small-Scale Programme of Activities Design Document (SSC-PoA-DD).
- Register SSC-PoA with UNFCCC CDM Executive Board.
- Develop SSC-CPA Design Document (SSC-CPA-DD) in accordance with criteria stipulated in the SSC-PoA-DD.
- Include SSC-CPAs to the SSC-PoA upon satisfaction of the eligibility criteria stipulated in the SSC-PoA-DD.
- Register SSC-CPA-PDD with UNFCCC and pay any associated registration fee to the UNFCCC
- Source and contract CFL manufacturer/Supplier. Ensure CFLs meet the requirements stipulated in AMS-II.J Version 4. i.e. Lumen, rated life/average rated life, compliance with national and international standards
- Source Designated Operational Entity (DOE). Get SSC-CPA–PDD validated /verified by a DOE Pay DOE validation/verification fee
- Officially communication with the CDM ExecutiveBoard, DOE and host country DNA.
- Allocate CERs generated from SSC-CPA as applicable.
- Secure financing of initial investment. Source and contract Annex 1 buyer of CERs

SSC-CPA implementer(s) shall:

- Define geographic boundary of the SSC-CPA
- Determine grid-connected residential households in the SSC-CPA
- Establish record keeping and database of grid connected residential households in the SSC-CPA, including where applicable, name, address, electricity bill folio
- Distribute/install CFLs to grid connected households and collection of replaced incandescent light bulbs
- Establish dedicated drop-off centre(S) for the collection of broken, faulty or fused CFLs
- Arrange storage, disposal and independent verification by a qualified third party(s) of replaced incandescent light bulbs in accordance with environmental norms of the host nation
- Select monitoring survey households from SSC-CPA database

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)

02 March 2012
Gbemi Cassandra Jayesimi
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Annex 1

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

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

If public funding is received by SSC-CPA(s) in the PoA, the SSC-CPA will affirm that such funding does not result in diversion of ODA and is separate from and is not counted towards the financial obligations of those parties.

Annex 3

BASELINE INFORMATION

Baseline Scenario
The baseline scenario is identified ex ante and ex post identification is based on the ex post monitoring surveys.

PoA Additionality
To comply with the guidance given in attachment A to Appendix B of the 'simplified modalities and procedures for small-scale CDM project activities', The project proponent has opted to use barrier analysis to demonstrate PoA additonality. The following barrier analyses, which are detailed in Section A.4.3, are conducted: access to capital, technology, information asymmetric and behavioural barrier. The analysis shows that the presence of one or more of these barriers will prevent the proposed project being carried out in the absence of CDM.

Determination of Emission Factor (EF)
As stipulated in paragraph 15 of AMS-II.J version 4, Emission Factor (EF) should be calculated in accordance with provisions under of AMS-I.D. For fossil fuel displaced from the grid as a result of the project activity, reliable local or national data for the emission factor shall be used.

The latest version of AMS I.D. is used to calculate the baseline Grid Emission Factor. To determine Grid Emission Factor, three parameters will be applied, namely: Operating Margin (OM), Build Margin (BM) and Combined Margin (CM).

The parameters are calculated using data from an official source (where available) and made publicly available, and the "Tool to calculate emission factor for an electricity system" version to 2.2. The EF will be used for the PoA, until the renewal of the PoA crediting period is undertaken at which point the Emission Factor will be revised.

Annex 4

MONITORING INFORMATION

Monitoring includes recording of lamp distribution data, and ex post monitoring surveys of Lamp Failure Rate (LFRi,y)

Paragraph 19 of AMS-II.J version 4 states:
During project activity implementation, the following data are to be recorded:

- Number of pieces of equipment distributed under the project activity, identified by the type of equipment and the date of supply;
- The number and power of the replaced devices;
- Data to unambiguously identify the recipient of the equipment distributed under the project activity;

The project activity abides by the above monitoring guidelines defined in AMS-II.J version 4 as follows. (For further details, refer to Section D.7.1 for the details of the parameters to be monitored and the measures that will be taken to monitor each of the parameter)

Project implementer will formulate and maintain a standardized data recording formats and SSC-CPA database approved by the coordinating/managing entity. Therefore, for the SSC-CPA to maintain appropriate records on lamp distribution, project implementer will document the following variables inter-alia:

- The physical geographic location of each CFL distributed and installed;
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date replacement took place;
- The specifications i.e nameplate and rated power of incandescent light bulbs exchanged and CFLs distributed and installed in households participating in the CPA;
- Unambiguous identification, including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFLs recipient.
- Signature of CFL recipient that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.

PoA Programme Database

The coordinating/managing entity will establish a secure, well-defined and adequate data management system. The PoA database will record, store, monitor and secure all information relevant to the entire project activity and all SSC-CPAs undertaken as part of the project activities. The PoA database will be fully backed.

The PoA database will record the start and end dates of each monitoring period and the emission reduction attributable to the monitoring period per SSC-CPA. The monitoring plan is designed to eliminate risk of double-counting between SSC-CPAs. Therefore rigorous record keeping procedures that include mutually exclusive dataset per SSC-CPA will be implemented to ensure that each monitoring period dataset can be transparently attributed to its corresponding SSC-CPA in order to prevent occurrence of double counting.

The SSC-CPA database will include the following data-set for each SSC-CPA:

- The physical geographic location of SSC-CPA;
- Number of pieces of CFL distributed/installed and date of distribution/installation;
- Number of pieces of incandescent light bulbs replaced and date replacement took place;
- The specifications i.e. nameplate and rated power of incandescent light bulbs exchanged and CFLs; distributed and installed in households participating in the SSC-CPA;
- Unambiguous identification, including name, address and if applicable, NEPA/PHCN/Official electricity bill folio number of CFLs recipient;
- Record of signature of CFL recipients that they relinquish any rights over the CERs generated from the project CFLs to the coordinating/managing entity, Icimi Ltd.
- Verification records including number of incandescent light bulbs destroyed and date of destruction CFL purchase and dispatch records, to prevent double counting.
- Lamp failure rates, determined by the ex post monitoring survey representing that SSC-CPA for each monitoring period.

Paragraph 20 of AMS-II.J version 4 states:
The following survey principles shall be followed for activities related to determining number of CFLs placed in service and operating under the project activity and, if required, determining the number of operating hours of baseline and project lamps:

- The sampling size is determined by minimum 90% confidence interval and the 10% maximum error margin; the size of the sample shall be no less than 100;
- Sampling must be statistically robust and relevant i.e., the survey has a random distribution and is representative of target population (size, location);
- The method to select respondents for interviews is random;
- The survey is conducted by site visits;
- Only persons over age 12 are interviewed;
- The project document must contain the design details of the survey.

Outline of Sampling Methodology

Areas covered	Description
Sampling objectives	The objective of sampling for the purpose of the project activity is to ascertain a statistically sound estimate of key variables that are used to calculate the emission reduction from the project activities based on a 90% confidence interval and 10% minimum error margin. The two variables are: • The number of CFLs placed in service and operating under the project activities ($Q_{PJ,i}$) • Lamp fail rate ($L_{FR,y}$)
Data To Be collected	**The number of CFLs placed in service and operating under the project activities ($Q_{PJ,i}$)** • Survey will be carried out through site visits to project households that have been randomly selected from the SSC-CPA database. • Sample data will be collected on only installed CFLs with an original marking (coordinating/managing entity's logo/name or unique identification details). Only those CFLs can be counted as installed;

	• SSC-CPA plan to replace faulty or defective CFLs within 1 year of installation. Such CFLs will be replaced as part of a regular maintenance or warranty program and will be counted as operating for the purpose of determining QPJ,i.; • CFLs cannot be replaced as part of this monitoring survey process and counted as operating for the purposes of determining QPJ,i. • Only persons over age 12 are interviewed for the survey **Lamp fail rate (LFR,y)** • Survey will be carried out through site visits to project households that have been randomly selected from the SSC-CPA database. • Sample data will be collected on only installed CFLs with an original marking (coordinating/managing entity's logo/name or unique identification details). Only those CFLs can be counted as installed; • SSC CPA plan to replace faulty or defective CFLs within 1 year of installation. Such CFLs will be replaced as part of a regular maintenance or warranty program and will be counted as operating for the purposes of determining QPJ,i.; • CFLs cannot be replaced as part of this monitoring survey process and counted as operating for the purposes of determining QPJ,i. • Only persons over age 12 are interviewed for the survey **Survey Frequency** The first *ex post* monitoring survey will be carried out within 12 months of CFL installation. Subsequent *ex post* monitoring surveys will take place in Years 4, Years 7 and Year 10 (depending on the length of the crediting period). However, SSC-CPA may choose to undertake subsequent ex post monitoring surveys more frequently than once every 3 years. In addition: • SSC-CPA will collect and collate sample data by means of site visits to sample households.
Target Population	The target population will be every household that received CFLs and whose details are recorded and stored in the SSC-CPA database.
Sample Method	The simple random sampling method will be used. Under this method, each project household that received CFLs from the SSC-CPA, and whose details are recorded and stored in the SSC-CPA database is chosen entirely by chance. Hence each project household has equal chance of being included in the sample.
Sample Frame	The sample frame is the list of households that received CFLs and whose details are recorded in the SSC_CPA database.
Sample Size	Desired precision/expected variance and sample size are determined as follows: As per AMS-II.J version 4, the sample size will utilise minimum 90% confidence interval and 10% maximum error margin. **Equation to determine sample size:** $\frac{z^2}{r^2}\frac{1-p}{p}$

	= $(z/r)^2 \times p \times 1(1-p)$ = $(1.645/0.1)^2 \times (0.5) \times 1(1-0.5)$ = $(135.30) * (0.5)$ = 68 As per AMS-II.J version 4, the minimum sample size is 100. Therefore a minimum sample size of 100 will be used to determine $Q_{PJ,i}$ and $L_{FR,y}$
"Cluster" of homogenous SSC-CPAs	If there are multiple SSC-CPAs in one geographic location and/or socio-economic population, and the target population of the SSC-CPAs can be demonstrated to be homogenous, SSC-CPAs will be clustered together and a single representative ex post monitoring survey will be carried out to satisfy monitoring requirements across like SSC-CPAs.

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