

**Swiss Association for Quality and
Management Systems (SQS)**

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CDM Validation Report

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Small-Scale (SSC) (PoA)

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1 Introduction

1.1 Objective

Do-inc business B.V. has retained SQS to validate the “LED’s kick-off” Programme of Activities (the PoA).

The objective of the validation process is to provide an independent assessment by a third party, a Designated Operational Entity (DOE), of a proposed Programme of Activities (PoA).

The assessment involves the evaluation of the project basis and design identified in the CDM-SSC-PoA-DD, CDM-SSC-CPA-DD generic and CDM-SSC-CPA-DD real-case using the defined criteria outlined by the registration under the Clean Development Mechanism (CDM). Wherever this report refers to PoA-DD or CPA-DD, it is meant as an abbreviation of CDM-SSC-PoA-DD and CDM-SSC-CPA-DD.

Validation is part of the CDM project cycle and results in a conclusion by the executing DOE on whether or not a project (programme) activity is valid to be submitted for registration to the CDM Executive Board (CDM-EB).

The ultimate decision on the registration of a proposed CDM SSC PoA rests with the CDM-EB and the Parties involved.

1.2 Scope

The scope of the validation is an independent and objective review of the CDM-SSC-PoA-DD, CDM-SSC-CPA-DD generic and specific CDM-SSC-CPA-DD and other documents using a risk-based approach and focusing on the identification of significant risks for project implementation and the generation of Certified Emission Reductions (CERs) against the criteria stated in:

- The Kyoto Protocol, in particular Article 12
- Decisions 2/CMP.1 and 3/CMP.1
- Modalities and Procedures for a Clean Development Mechanism
- The Clean Development Mechanism Validation and Verification Manual (version 1.2)
- AMS-II.C. Demand-side energy efficiency activities for specific technologies (version 13)
- Decisions and specific guidance issued by the CDM EB published under <http://cdm.unfccc.int>
- Glossary of CDM terms (version 06)
- General Guidelines to SSC CDM methodologies (version 17)
- Attachment A of appendix B of the "Simplified modalities and procedures for small-scale CDM project activities" (version 08, EB 63 Annex 24)
- Procedures for registration of a programme of activities as a single CDM project activity and issuance of CERs for a PoA (EB 55 Annex 38)
- Eligibility of activities under the CDM (EB 33 para. 30)
- Guidance on Programme of Activities (PoA) (EB 35 para. 15)
- Guidelines on Assessment of Debundling for SSC Project Activities (EB 54 Annex 13)
- Implementation plan for standards for programme of activities (version 01.0, EB 64 Annex 2)
- Standard for sampling and surveys for CDM Project Activities and Programme of Activities (version 03.0 EB 69 Annex 4)
- Standard for demonstration of additionality, development of eligibility criteria and application of multiple

methodologies for programme of activities (version 01.0, EB 65 Annex 3)

- Non-binding best practice examples to demonstrate additionality for SSC project activities (EB 35 Annex 34)
- Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5)
- Guidelines for objective demonstration and assessment of barriers (EB 50 Annex 13)
- Tool to calculate the emission factor for an electricity system (version 02.2.1)
- A comprehensive list of the normative references given in the validation protocol (Appendix F).

SQS has remained independent during the validation process, free from bias and conflict of interest. SQS has maintained objectivity throughout the validation to ensure that the findings and conclusions will be based on objective evidence generated during the validation.

SQS has maintained trust, integrity, confidentiality and discretion throughout the validation process. This report reflects truthfully and accurately the validation activities.

SQS has exercised due professional care and judgement in accordance with the importance of the task performed.

The PoA-DD, CPA-DD generic and CPA-DD real-case validation findings are presented in a reporting structure in which

indented paragraphs will provide the validation findings related to the CPA-DD generic and real-case and text with

normal margins will be used for the PoA-DD related findings.

This presentational structure will provide for an easy distinction between the two levels of a PoA; the programme itself and the first, real implemented project activity component, the CPA-001.

1.3 The Programme of Activity and first CPA at glance

The PoA

The programme aims at creating a marketing platform for supporting the increased usage of high quality LED lighting equipment (Light Emitting Diodes). By principle, the programme is open to different LED technology producers, distributors and developers. The programme involves the installation of LED equipment in publicly, commercially, industrially or otherwise employed locations. LED lighting equipment may include both an LED light source (lamp) as well as LED luminaries. The programme will enable the participating LED lighting equipment providers, distributors and developers to use additional CER income to enable LED lighting equipment to effectively compete with low-cost/less-efficient products in South Africa.

CPA-001

The CPA-001 under the PoA will target mining and petrochemical plant activities of one key industrial player who is not yet named publicly due to confidentiality reasons. The project participants have been convincing this key industrial player to participate under the CPA-001 and install LED lighting equipment and luminaries at its industrial operations. The geographical coordinates of the site where the CPA-001 LED lighting equipment and luminaries will be installed are submitted to the UNFCCC Secretariat as part of the Request for Registration process. The CPA owner will obtain the LED lighting equipment at favourable conditions due to CER benefits.

The proposed specific SSC-CPA is based on a real case and will abate greenhouse gas emissions through the increase in energy efficiency of the targeted lighting systems and the corresponding fossil-fuel combustion avoided from generating electricity. The CPA-001's size is defined according to the estimated savings resulting from the present annual volume of replacement of lights/luminaries within the enterprise. Thus CPA-001 is expected to reduce 48 434 of CO₂e tons annually and 484 345 of CO₂e over the selected ten-year fixed crediting period.

PoA project participants (PPs) are:

The authorised CME of the PoA is Lemnis Lighting B.V., registered in The Netherlands. Other PPs of the PoA are Mabanaft B.V and Do-Inc business B.V., both of them registered in The Netherlands.

The CDM-POA-DD was published for global stakeholder consultation on 24/12/2010.

The starting date of the CPA-001 is 02/10/2012. Though the DOE is not required to assess prior consideration of CDM for PoAs in line with EB 62 Annex 13 requirements, it is confirmed that the first component of the programme will commence after the start date of validation, 01/07/2010, the contract signature for validation and 24/12/2010 the publishing of the PoA documentation for Global Stakeholder consultations. The CPA-001, uses a fixed, 10-year period and it will start on 30/10/2012.

The starting date of the PoA will be 02/10/2012 or the date of registration as a CDM PoA, whichever is the latest. The length of the programme of activities is the maximum allowed, namely 28 years.

1.4 Validation approach

The DOE applies standard auditing techniques to assess the correctness, accuracy, relevance, completeness, consistency, transparency and conservativeness of the information provided by the PPs, including, where appropriate, but not limited to:

- a) Document review, involving: review of data and information to verify the correctness, credibility and interpretation of information, cross-checks between information provided in the PDD and information from other sources, if available, and if necessary independent background investigations.
- b) Follow-up actions (on-site visit, telephone, email interviews), including: interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation and cross-checks between information provided by interviewed personnel to ensure that no relevant information has been omitted from the validation.
- c) Reference to available information relating to projects or technologies similar to the proposed CDM project activity under validation.
- d) Review, based on the approved methodology being applied, of the appropriateness of formulae and correctness of calculations.

Requests: The DOE raises a corrective action request (CAR) if:

- a) The PPs have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- b) The CDM requirements have not been met; or
- c) There is a risk that emission reductions cannot be monitored or calculated.

The DOE raises a clarification request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The DOE raises a forward action request (FAR) during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs do not relate to the CDM requirements for registration.

The PP shall respond to all requests with sufficient evidence.

The DOE resolves or “closes out” CARs and CLs only if the PPs modify the project design, rectify the PDD or provide adequate additional explanations or evidence that satisfies the DOE’s concerns. If this is not done, the DOE does not recommend the project activity for registration to the CDM Executive Board.

Methodology-specific validation protocol: To organize its validation of methodology-specific requirements, the DOE has used a methodology-specific validation protocol for the project, attached to this report as Appendix F.

The validation team has the necessary skills and competences to undertake the validation as listed in Appendix D: Certificates of Competence.

2 Validation Opinion

2.1 Summary of the validation conclusions

Based on

- PoA-DD, generic CPA-DD and CPA-001-DD version 7 dated 07/11/2012 [6]
- Consulted documents listed in Appendix C
- The Clean Development Mechanism Validation and Verification Manual (version 1.2)
- AMS-II.C. Demand-side energy efficiency activities for specific technologies (version 13)
- Decisions and specific guidance issued by the CDM EB published under <http://cdm.unfccc.int>
- Glossary of CDM terms (version 06)
- General Guidelines to SSC CDM methodologies (version 17)
- Attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities" (version 08, EB 63 Annex24)
- Procedures for registration of a programme of activities as a single CDM project activity and issuance of CERs for a PoA (EB 55 Annex 38)
- Eligibility of activities under the CDM (EB 33 para. 30)
- Guidance on Programme of Activities (PoA) (EB 35 para. 15)
- Guidelines on Assessment of Debundling for SSC Project Activities (EB 54 Annex 13)
- Implementation plan for standards for programme of activities (version 01.0, EB 64 Annex 2)
- Standard for sampling and surveys for CDM Project Activities and Programme of Activities (version 03.0 EB 69 Annex 4)
- Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5)
- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (version 01.0, EB 65 Annex 3)
- Non-binding best-practice examples to demonstrate additionality for SSC project activities (EB 35 Annex 34)
- Guidelines for objective demonstration and assessment of barriers (EB 50 Annex 13)
- Tool to calculate the emission factor for an electricity system (version 02.2.1)
- A comprehensive list of the normative references given in the validation protocol (Appendix F).
- Site visit meetings with CME, monitoring, scrapping, design and financial experts on 19-22 October 2010

It is SQS' opinion, that the small-scale programme of activity "LED's kick-off" described in the CDM-SSC-PoA-DD, generic CDM-SSC-CPA-DD and specific CDM-SSC-CPA-DD (CPA-001) with a PoA length of 28 years, a PoA starting date of 02/10/2012 or the date of registration as a CDM PoA and the 10-year fixed crediting period of the CPA-001 from 30/10/2012 to 29/10/2022 meet all relevant criteria of the listed references.

SQS confirms that the approved Methodology AMS.II.C "Demand-side energy efficiency activities for specific technologies" version 13.0, (EB 48 Annex 16) is applicable for this programme activity and that the criteria are discussed in an exhaustive manner in the CDM-SSC-PoA-DD, generic CDM-SSC-CPA-DD and specific CDM-SSC-CPA-DD (CPA-001) and supported by the submitted documents. Furthermore, the approved methodology is correctly applied to calculate project and baseline emissions, leakage and emission reductions for the calculation of emission reductions and therefore, SQS requests the registration of given

CDM programme of activity.

2.2 Summary of the validation methodology and process used and the validation criteria applied

The validation process has been carried out using the methodology described above in paragraph 1.4.

In the course of the PoA validation according to VVM. 1.2 . para 168 SQS has assessed the specific CDM SSC CPA-DD (CPA-001) , which the project participants submitted together with the CDM-SSC- PoA-DD for validation, to determine whether or not it complies with the eligibility criteria specified in the PoA-DD [6].

This has included

- A desk-review of the POA-DD, generic CPA-DD and CPA-DD of CPA-001 including the annexes and the additional documents not limited to those provided by the project participants. All reviewed documents are listed in Appendix C.
- On-site visit between 19-22 October 2010 including interviews with CME, monitoring, scrapping, design and financial experts. The detailed on-site visit programme is in Appendix A; the full list of interviews is in Appendix B.
- Liaison with the DNA of South Africa in the course of the domestic stakeholder consultation process prior to the issuance of LoA on 22 February 2012.
- Follow up interviews with project participants.

12 CARs, 14 CLs and one FAR have been raised; of these all CARs and all CLs are closed. As a consequence of these requests the CDM-SSC-PoA-DD has been modified from the original version 2 (22/12/2010) to the current 7 (dated 07/11/2012), the generic CDM-SSC-CPA-DD has been modified from the original version 2. (22/12/2010) to the current version (7 dated 07/11/2012) and the specific CDM-SSC-CPA-DD has been modified from the original version 2 (22/12/2010) to the current version 7 (dated 07/11/2012)

2.3 Description of project components or issues not covered by the validation process

All project components have been covered by the validation process.

2.4 Statement on the validation of the expected emission reductions of CPA-001

The expected average emission reduction of 48 434 tCO₂e per year and 484 345 tCO₂e for the fixed crediting period of 10 years from 30/10/2012 to 29/10/2022 is correctly, accurately and conservatively calculated for CPA-001. The calculation of the baseline emissions are replicable using data and values listed in CPA-001.

2.5 Statement whether the proposed CDM PoA meets the stated criteria

Based on the observations made during the validation process SQS concludes that the proposed programme of activity complies with the requirements of paragraph 37 of the CDM modalities and procedures, the applicability conditions of the selected methodology and guidance issued by the CDM Executive Board. It is the opinion of, that SQS the statements in the documentation are complete, accurate, credible and reliable; the assumptions made in the CDM-SSC-PoA-DD and specific CDM-SSC-CPA-DD are conservative.

3 Validation Findings

3.1 Global stakeholder consultation

The POA-DD, generic CPA-DD and specific CPA-DD version 2 dated 22/12/2010 were published on 24/12/2010 for global stakeholder consultation open for comments for 30 days.

The project activity received no comments.

3.2 Approval

Receipt of Letter of Approval (LoA):

The LoA Host Party without reference number dated 22/02/2012 has been received [8] by Lemnis Lighting B.V.. The LoA is from the DNA of The Republic of South Africa, the host Party.

LoAs from the other party with reference 2011ANL431 dated 08/03/2011 by Mabanaft B.V and with reference 2011ANL446 dated 11/03/2011 by Do-Inc business B.V. and with reference 2011ANL448 dated 11/04/2011 for Lemnis Lighting B.V. have been received [9]¹. The Annex I LoAs are from the DNA of The Netherlands. LoAs indicate the participation of each PP having been approved by a Party to the Kyoto Protocol. No entities other than those approved as PPs are included in the PoA-DD.

LoA source:

The host country LoA was received by one of the PPs, the CME of the PoA Lemnis Lighting B.V. and the LoAs from The Netherlands were received by the respective PPs.

Authenticity:

The authenticity of the LoAs was confirmed through the issuers of the LoAs. The LoA issued by The Republic of South Africa is listed on the DNA's website² and its authenticity is without doubt. The LoAs issued by The Netherlands are listed on the DNA's website³ on page 5 and 14 respectively.

Statements:

The LoA host party, The Republic of South Africa, dated 22/02/2012 include clear statements that:

1. The Republic of South Africa is a Party to the Kyoto Protocol
2. Participation is voluntary;
3. The proposed CDM PoA supports the sustainable development of The Republic of South Africa;
4. It refers to the precise proposed CDM project activity title in the PoA-DD
5. The Project is located in South Africa
6. The boundary for the project activity is the physical boundary of the Republic of South Africa
7. Lemnis Lighting B.V. is the CME for the PoA

It must be noted that the LoA from The Republic of South Africa contains a list of additional conditions on its second page with a,b and c marks. These conditions refer to the following:

- (a) The DNA may not be held liable in the event that ownership of the project is disputed;

¹ The three individually issued LoAs are merged into one, single document in line with CDM procedures.

² The website of the DNA of The Republic of South Africa:

http://www.energy.gov.za/files/esources/kyoto/2012/CDM_Projects_Portfolio_19_June%202012.pdf (last accessed on 17/07/2012)

³ The website of the DNA of The Netherlands:

<http://www.agentschapnl.nl/sites/default/files/bijlagen/Overview%20of%20issued%20Written%20Approvals%20for%20participation%20in%20a%20CDM%20project%20activity%20per%204%20April%202012.pdf> (last accessed on 17/07/2012)

- (b) The project must be developed in accordance with the Project Design Document received by the DNA;
- (c) DNA retains the right to withdraw the authorisation granted in terms of the Letter of Approval in the event of non-compliance with the Project Design Document;

SQS validated that these additional conditions (a to c) introduced by the DNA of The Republic of South Africa do not compromise VVM article 45-46 requirements therefore, the LoA of The Republic of South Africa is unconditional with respect to (1) to (4) above. SQS sought clarification from the South African DNA and the DNA clarified that the project changes referred in the conditions (a,b,c above) are related exclusively to the changes for the Sustainable Development Contributions of the project and not to its technical part [48]. The LoA does not specify the PDD Version number.

The LoAs from the other party, The Netherlands, dated 08/03/2011, 11/03/2011 and 11/04/2011 [9] include clear statements that:

- (a) The Netherlands is a Party to the Kyoto Protocol;
- (b) Participation is voluntary;
- (c) It refers to the precise proposed CDM project activity title in the PDD

The LoAs are unconditional with respect to (a) to (c) above.

The LoA does not specify the PDD Version number.

Letters of approval do not contain any additional specification of the project activity.

3.3 Authorisation

The Coordinating or Managing Entity (CME) of the PoA and the PPs are listed in tabular form in section A.3 of the CDM-PoA-DD. This has been validated against the contact details provided in Annex 1 of the CDM-PoA-DD and the LoAs provided for each entity. The CME, Lemnis Lighting B.V., is explicitly authorised by the host country DNA to act as the Coordinating and Managing entity for the PoA [8].

Participation of Do-inc business B.V., Mabanafit B.V. and Lemnis Lighting B.V. has been approved by Written Approval of The Netherlands [9] which is Party to the Kyoto Protocol.

Do-inc business B.V., on behalf of the CME, is responsible for the development and documentation of the "LED's kick-off" project.

No entities other than the approved as PPs are included in the A.3. Section of the CDM-PoA-DD.

3.4 Contribution to sustainable development

The host Party's DNA confirmed the contribution of the project to the sustainable development of the host Party.

SQS was able to confirm during the on-site visit the CPA-001's contribution to the sustainable development of the host Party.

3.5 Modalities of Communication

The Modalities of Communication statement, including its Annexes, is complete and has used the VVM-track applicable Version of the form "Modalities of Communication statement" (F-CDM-MOC)[10] and complies with all relevant forms and requirements.

3.6 Project design document

The CDM SSC CDM-PoA-DD was completed using the latest Small-Scale CDM Programme of Activities Design Document form (version 1.0). The CDM SSC-PoA-DD [6] complies with relevant forms and guidance and is appropriate to the type of project activity.

A generic CPA-DD has been established in order to include further CPAs under the PoA. SQS has checked its consistency to the PoA-DD. The CDM SSC-CPA-DD was completed using the latest CDM-SSC-CPA-DD form (version 1.0). Both, the generic and the specific, CDM SSC -CPA-DDs [6] comply with relevant forms and guidance and are appropriate to the type of project activity.

3.7 Description of project activity

The programme aims at creating a marketing platform for supporting the increased usage of high quality LED lighting equipment (Light Emitting Diodes) developed and manufactured by Lemnis Lighting B.V. The programme involves the installation of LED equipment in publicly, commercially, industrially or otherwise employed locations. LED lighting equipment may include both an LED light source (lamp) as well as LED luminaries. The programme will enable the LED producer Lemnis Lighting B.V. and its distributors to use additional CER income to enable LED lighting equipment to effectively compete with low-cost/less-efficient products in South Africa. It will contribute to transforming the South African lighting market towards high-quality and high-efficiency lighting products. In doing so, the PoA will abate greenhouse gas emissions through the avoided use of electricity and corresponding fossil-fuel combustion. It will reduce national electricity demand and lower stress on the energy infrastructure.

The proposed PoA is a voluntary coordinated action and encompasses two types of activities:

- Brownfield; replacement of existing lighting equipment with LED lighting equipment; and
- Greenfield; the installation of LED lighting equipment on new locations where LED equipment is not the common practice.

At Greenfield locations the most conservative common-practice will be taken as the baseline. At Brownfield locations, old lighting equipment collected during the exchange will be scrapped. This will prevent leakage and ensure correct disposal of old lamps. The scrapping will be independently verified as is required by the methodology AMS-II.C.

The DOE's validation opinion is that the project description is accurate and complete. The CME has developed an Operational Manual [12] for the implementation of the PoA, and defined all required procedures to include a CPA under the PoA. The usability of the procedures has been demonstrated by the first, specific CPA-DD based on a real case.

The description of the project activity contained in the PoA-DD and CPA-DDs is unambiguous, detailed and provides a good overview of the project. Its content was confirmed by means of document review, an on-site visit and interviews in the 19-22 October 2010 period in order to validate the accuracy and completeness of the project description.

SQS has undertaken the validation of the CPA-001 by reviewing the available documentation including the full documentation [16-20] between the CPA-001 owner, an incumbent mining and petrochemical giant whose name is not yet made public due to confidentiality reasons. SQS has also looked at the physical evidence – such as sample luminaries designed and developed specifically for the first CPA – in the course of the validation. The geographical coordinates of the site where the CPA-001 LED lighting equipment and

luminaries will be installed are submitted to the UNFCCC Secretariat as part of the Request of Registration process⁴.

Main changes between the PoA documentation (version 2, dated 2 (22/12/2010)[2] published for the 30-day stakeholder commenting period and the final version (version 6, dated 20/08/2012) [6], submitted for registration are issues related to the CARs and CLs identified during validation. The PoA documentation changes are related to CLs and CARs covering the following areas:

CAR 1,6,7, CL 3, 12: Progress and changes (e.g. EB 63 Annex 3, EB 63 Annex 2) during the validation process to reflect the changes/developments between initial UNFCCC Global Stakeholder process submission in December 2010 and the host country LoA issuance on 22 February 2012.

CAR2: LoAs of the project

CAR 3,4,8,10,11,12 CL 9, 10: Operational, monitoring and sampling requirements adjustments to reflect changing rules during validation

CAR 5: Local stakeholder consultation

CAR 9, CL 6,13: Use of additionality tool

CL1,4: PoAs interrelationship with South African state programmes re. Poverty alleviation, technological developments etc.

CL 2,5: use of abbreviations and precise official terms

CL 7, 8,14: Editorial and formatting issues

CL 11: Public funding

The above-mentioned 12 CARs and 14 CLs, the respective PP responses and SQS conclusions can be consulted in the final section of Appendix F, under the “Summary of Requests” heading. The section contains the CPA-001 related single FAR raised that should be addressed at the first verification of CPA-001.

Each CDM Program Activity consists of the replacement of existing lighting equipment with LED lighting equipment (Brownfield) and/or the installation of LED lighting equipment on new locations where LED equipment is not the common practice (Greenfield).

The first CPA under the PoA will target mining and petrochemical plant activities of one key industrial player who is not yet named publicly due to confidentiality reasons. The project participants have been convincing this key industrial player to participate under the CPA-001 and install LED lighting equipment and luminaries at its industrial operations. The geographical coordinates of the site where the CPA-001 LED lighting equipment and luminaries will be installed are submitted to the UNFCCC Secretariat as part of the Request of Registration process. The CPA owner will obtain the LED lighting equipment at favourable conditions due to CER benefits. The proposed specific SSC-CPA is based on a real case and will abate greenhouse gas emissions through the increase in energy efficiency of the targeted lighting systems and the corresponding fossil-fuel combustion avoided from generating the electricity. The first CPA's size is defined according to the estimated savings resulting from the present annual volume of replacement of lights/luminaries within the enterprise. Thus CPA-001 is expected to reduce 48 434 of CO₂e tons annually and 484 345 of CO₂e tons over the selected ten-year fixed crediting period.

The description of the PoA and CPA-001 activity contained in the CPA-DD is unambiguous, detailed and provides a good overview of both the PoA and its CPA-001.

⁴ Coordinates are not made public due to confidentiality. As stated, coordinates are known by the UNFCCC and SQS, the Validator of the PoA and its first CPA-001.

Validation method

The accuracy and completeness of the project description was validated by:

1. A desk review of the PDD submitted by the client and additional supporting documents
2. On-site visit in the 19-22 October 2010 period including interviews with PPs, monitoring and scrapping agents and affected stakeholders
3. Liaison with the DNA of South Africa related to project specifics leading to the issuance of the host country LoA.
4. Cross-checks with independent sources

The project will not receive any public funding; this has been declared by the CME for the PoA [49]. The PoA-DD has additional data listed in its Annexes 3 and 4.

The DOE's validation opinion is that both the PoA and CPA-001 project descriptions are accurate and complete.

3.8 Application of the selected baseline and monitoring methodology

3.8.1 General requirement

SQS confirms that the baseline and monitoring methodology AMS.II.C version 13, selected by the project participants is the valid version approved by the CDM Executive Board. SQS confirms that the programme of activities belongs to UNFCCC Scope 3, Energy Demand, TA 3.1 Energy Demand.

The project applies the following tools and guidelines, which are referenced in the abovementioned methodologies:

- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (version 01.0)
- The methodology refers to AMS.I.D which again refers to the tool to calculate the emission factor for an electricity system. Therefore it is SQS opinion that the Tool to calculate the emission factor for an electricity system (version 02.2.1) is applicable and appropriate to calculate the emission factor for an electricity system.
- Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities
- Guidelines on Assessment of de-bundling for SSC Project Activities, version 03 EB 54 Annex 13
- General guidelines for SSC CDM methodologies version 17, EB 61 Annex 21
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3.8.2 Applicability of the selected methodology to the project activity

In AMS-II.C applicability criteria are given in para. 1 to 16 and specific applicability criteria for this methodology under a programme of activity are given in para. 17. All criteria have been validated against the PoA as below:

Para. 1. This methodology comprises activities that encourage the adoption of energy-efficient equipment/appliance (e.g., lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems) at many sites. These technologies may replace existing equipment or be installed at new sites. In the case of new facilities, the determination of baseline scenario shall be as per the procedures described in the general guidance to SSC methodologies under the section 'Type II and III Greenfield projects (new facilities)'. The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year for electrical end-use energy efficiency technologies. For fossil-fuel end-use energy efficient technologies, the limit is 180 GWh thermal per year in fuel input.

The PoA is a voluntary programme that encourages the adoption of energy-efficient equipment (LEDs) at many sites. It will replace existing equipment (Brownfield) or be installed at new sites (Greenfield).

PoA CPA eligibility criteria N°15 and PoA-DD section E.2 justification of the choice of the methodology consider that the aggregate energy savings by a single CPA may not exceed the equivalent of 60 GWh per year for electrical end use energy efficiency technologies. SQS confirms that the proposed PoA is in accordance with para. 1 of AMS-II.C and each CPA under the PoA will meet the requirements of a small scale project activity. The eligibility criteria N°15 is according to the requirement of EB 65 Annex 3 para. 14.

Para. 2. For each replaced appliance/equipment/system the rated capacity or output or level of service (e.g., light output, water output, room temperature and comfort, the rated output capacity of air-conditioners etc.) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline.

The specifications of Lemnis LED lights/luminaries including the level and type of services and the performance specifications including compliance with testing/certification have been checked by SQS. Due to the precise manufacturers' specifications it is unambiguous which type of LED lamp (Watt) will replace which type of non-LED lamp (Watt) and how the same service level (lux/m²) is ensured and verified for Brownfield and Greenfield project sites.

Level of service as per EB 65 Annex 3 para 14 (c) has been listed as CPA eligibility criteria No 5. The AMS-II.C applicability criteria are also reflected in the Section E.2 of the PoA-DD and the CME Operational Manual [12]. SQS confirms that the proposed PoA is in accordance with para. 2 of AMS-II.C

Para. 3. If the energy-efficient equipment contains refrigerants, then the refrigerant used in the project case shall be CFC free. Project emissions from the baseline refrigerant and/or project refrigerants shall be considered in accordance with the guidance of the Board (EB 34, paragraph 17). This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment/appliances.

The PoA and the CPAs to be included contain energy-efficient LED lighting equipment. Therefore provisions of para. 3 are not applicable.

Para. 4. The project boundary is the physical, geographical location of each measure (each piece of equipment) installed.

In case of the PoA the physical, geographical programme boundary is South Africa. In case of an individual CPA the project boundary is the physical, geographical location of each measure within the programme boundary. CPA eligibility criteria N°2 requires that end user locations are uniquely identifiable. Therefore SQS confirms that any CPA to be included to the proposed PoA will be in accordance with para. 4 of AMS-II.C

Para. 5. If the energy displaced is fossil fuel based, the energy baseline is the existing level of fuel consumption or the amount of fuel that would be used by the technology that would have been implemented otherwise. The emissions baseline is the energy baseline multiplied by an emission factor for the fossil fuel displaced. Reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.

As provided in PoA LED lighting equipment saves electricity, therefore para. 5 is not applicable.

Para. 6. If the energy displaced is electricity, the emission baseline is determined using one of the two following options:

Option 1: The product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced:

Option 2: The specific energy consumption of the system in the baseline times the output in project year y times the emission factor for the electricity displaced. This option can only be used where comparable conditions for the output in the baseline and project can be established.

The PoA-DD correctly states that because the energy displaced is electricity, the emission baseline is determined as the product of the baseline energy consumption and the emission factor for the electricity displaced as per Option 1 of methodology AMS-II.C. The proposed PoA selected Option 1 which is in accordance with para. 6 of AMS-II.C.

Para. 7. For project activities that seek to retrofit or modify an existing unit or equipment resulting in an increase in capacity, the determination of the baseline scenario for the incremental capacity shall be based on the procedures described in the general guidance to SSC methodologies under the sections 'retrofit' and 'capacity increase'. As provided in PoA LED lighting equipment saves electricity without any increase in capacity, therefore para. 7 is not applicable.

Para 8. Project emissions consist of electricity and/or fossil fuel used in the project equipment
As provided in E.3 in the PoA-DD the project emissions consist of electricity. SQS confirms that the proposed PoA is in accordance with para. 8 of AMS-II.C.

Para 9. Project emissions from physical leakage of refrigerants are accounted for. All GHGs as defined per Article 1, paragraph 5 of the Convention shall be considered as per the guidance by the Board.
The PoA only includes energy efficient lighting equipment. Therefore para. 9 is not applicable.

Para 10. If the energy efficiency technology is equipment transferred from another activity, leakage is to be considered.
As provided in the PoA-DD energy efficiency technology consists of new LED lamps/ luminaries which are not transferred from another activity. Therefore para. 10 of AMS-II.C. is not applicable.

Para. 11. The emission reduction achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.
As discussed under clause 3.5.5 in this report para. 11 is met by the PoA.

Para. 12. If the devices installed replace existing devices, the number and "power" of a representative sample of the replaced devices shall be recorded in a way to allow for a physical verification by DOE.
The parameters 'number' (ni) and 'power' (pi) of the replaced devices are recorded for a representative sample of the replaced devices as follows: As per paragraph 12 of AMS II.C. Demand-side energy efficiency activities for specific technologies a representative sample of the replaced devices (including the number and "power") will be recorded to allow for physical verification by the DOE. The number and "power" of the replaced equipment to be recorded for physical verification is based on the identified samples to be metered (Smetered,k). If a meter is installed the replaced lamp is collected and stored for verification. This change was also incorporated into the CME Operational Manual procedures [12]. SQS confirms that the proposed PoA and its CPA is in accordance with para. 12 of AMS-II.C.

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

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

OR (b) Metering the "energy use" of an appropriate sample of the devices installed.

LEDs have constant current (ampere) characteristics. The monitoring plan of the PoA-DD demonstrates that the "power" and "operating hours" will be monitored using method (a). Validation of the monitoring plan is provided in Section 3.7 of this report. Based on the validated monitoring plan and sample requirements SQS confirms that the proposed PoA is in accordance with para. 13 of AMS-II.C.

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

Based on the validated monitoring plan and sample requirements (please refer to Section 3.7 of this report) SQS confirms that the proposed PoA is in accordance with para. 14 of AMS-II.C.

Para. 15. If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the “energy use” of an appropriate sample of the devices installed. Monitoring shall also include annual checks of a sample of non-metered systems to ensure that they are still operating.

Considering para 13, para. 15 is not applicable.

Para 16. For pumping systems monitoring of project activity shall consist of metering the pumping energy use, hourly or daily discharge (m³ per day or hour) and the total delivery head (m).

With regard to the description of the programme in the PoA-DD the PoA does not consist of pumping systems. Para. 16 is therefore not applicable.

The following conditions apply for use of this methodology in a project activity under a programme of activities: Para 17. In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment corresponds to each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.

Project participants have included the procedure for collecting and/or storing including scrapping, as per AMS-II.C version 13 para. 17 under the CME Operational Manual procedure CME/01/12 and PoA-DD E.7.1. Data and parameters to be monitored by each CPA. All destruction processes will be independently verified by a local environmental audit company, and the result of such process will be presented to the verifying DOE. The CME will ensure this process is followed by including this procedure in the relevant contracts between CME and CPA owner and between CPA owner and scrapping entity. Procedure CME/01/12 delineates that any CPA operator is required to comply with government guidelines and legislation regarding the environmentally sound management of mercury from end-of-life mercury using lamps (for further details please refer to section 3.11 Environmental impacts). Procedure CME/01/12 and the monitoring method of parameter n_{scrapped} to be monitored by each CPA are in accordance with para. 17

SQS confirms that the applicability criteria of the selected small-scale methodologies are met and the project activity is not expected to result in emissions other than those allowed by the methodologies. SQS confirms further that the choice of methodology is justified, its content is correctly quoted and interpreted in the PoA-DD as well as in the CPA-DDs and the CME has shown in the PoA-DD that the programme meets each of the applicability conditions of the approved methodologies or any tool or other methodology component referred to therein.

Non-coverage by the methodology

No greenhouse gas emission within the project boundary is caused by the implementation of the CPA-001, which contributes more than 1% of the expected annual emission reductions and is not addressed by the applied methodology.

3.8.3 Deviation from an approved methodology

Neither the PoA nor the CPA-001 deviate from the applicable methodology.

3.8.4 Clarification on the applicability of an approved methodology

Neither the PoA nor the CPA-001 requires any clarification on the applicability of an approved methodology.

3.8.5 Project boundary of PoA and CPA-001

The project boundary is the physical, geographical location of each piece of equipment installed within the boundary of the PoA. The PoA boundary is The Republic of South Africa. The boundary as defined in the revised PoA-DD and the CPA-DD is in now in line with EB60 Annex 26.

In the establishment of the boundary of the PoA the CME has taken into consideration all applicable national and sectoral policies and regulations within the chosen boundary, South Africa. SQS confirms that no mandatory policies with regard to LED lighting equipment exist for the time being in South Africa. Eligibility criteria No 10 "Does the CPA rule out including facilities that are covered by an enforced government policy that includes mandatory adoption of LED lighting equipment?" guarantees that the inclusion of any future CPA will address this issue within the South African regulatory environment.

The DOE could not conduct a site visit due to the early stage of commercial discussions at the first physical project site, which could be otherwise deemed representative for all other sites to be included in CPA-001; the DOE was able to conduct a thorough check of the documentation and the physical inspection of the luminaries designed for the CPA-001. CPA-001 involves only sites that belong to the CPA-001 owner, whose mining/production locations are known and listed in a publicly available manner. The first LED lighting equipment to be installed under CPA-001 is a Brownfield activity that retrofits lighting equipment. Installation of LED lamps is performed in a way to guarantee that newly installed LED lamps provide the same light output than the replaced equipment. The currently installed equipment and its replacement is listed in the DD of CPA-001. The existing, non-sparking, luminaries are equipped with two 36 Watt tubes and one 40 Watt ballast, which add up to a total of 112 Watt. The source of electricity is from the grid for all CPA-001 newly installed LED lamps. The geographical coordinates of the site where the CPA-001 LED lighting equipment and luminaries will be installed are submitted to the UNFCCC Secretariat as part of the Request of Registration process⁵.

The emission sources included are:

Source		Gas	Included?	Justification / Explanation
Baseline	Power plants servicing the electricity grid	CO ₂	Yes	Main source of emission.
		CH ₄	No	Excluded for simplification. Minor source of emission. Conservative.
		N ₂ O	No	Excluded for simplification. Minor source of emission. Conservative.
Project Activity	Power plants servicing the electricity grid	CO ₂	Yes	Main source of emission.
		CH ₄	No	Excluded for simplification. Minor source of emission. Consistent with baseline.
		N ₂ O	No	Excluded for simplification. Minor Source of emission. Consistent with baseline.

CO₂ is included as this is the main emission source, methane and nitrogen oxide are excluded for simplification purpose. The PoA-DD has described the GHG emission sources that will occur during the operation

⁵ Coordinates are not made public due to confidentiality. As stated, coordinates are known by the UNFCCC and SQS, the Validator of the PoA and its first CPA-001.

of the project activity as per the methodology applied. The emission included in or excluded from the project boundary is justified and explained

As such, SQS confirms that the project boundary is correct and the selected sources and gases are justified for the project activity and meet the requirements of the methodology. Based on the above assessment, the DOE hereby confirms that the identified boundary and the selected sources and gases are justified for the project activity.

It is the DOE's opinion, that no greenhouse gas emissions occur within the proposed CDM project activity boundary as a result of the implementation of the project activity, which are expected to contribute more than 1% of the overall expected average annual emissions reductions, and are not addressed by the applied methodology.

SQS confirms that there is no registered small-scale project activity under the CDM or a request to register another small-scale CDM project activity by the CME or the CPA owner or anyone else within the previous two years with the same project category and technology within one kilometre of the project boundary of the proposed CPA-001 project. SQS has consulted the database of the South African DNA⁶ including PIN (Project Idea Note) and PDDs submitted for approval and those projects which have received their LoAs. The owner of the CPA-001 has numerous CDM projects in various stages of development, but not for the technology applied in the LED PoA; the two other LED projects are at an early, PIN stage and do not overlap with CPA-001's geographical boundaries. Therefore, the proposed CPA-001 project is not a de-bundled component of another project activity in accordance with EB 47 Annex 32.

3.8.6 Baseline identification and description

The steps taken to assess the requirement given in paragraph 81 and 82 of the VVM are described below:

The energy efficiency measure of the installation of LED lighting equipment saves electricity therefore the emission baseline is correctly determined as the product of the electricity consumption of the old equipment replaced (in case of Brownfield) or the electricity consumption of the equipment avoided (in case of Greenfield) and the emission factor for the electricity displaced.

SQS confirms that there is no South African energy, environmental, building or any other regulation that considers the implementation of LED lighting as mandatory. SQS checked the respective regulations related to the electric market, the environment, the built environment and has found that there is no sectoral or national regulation obliging any potential CPA owner to install LED lighting and /or luminaries.

Baseline identification for Brownfield project sites

The identification of alternatives is elaborated in the PoA-DD according to the approved methodology and the General Guidelines to SSC CDM methodologies (version 17). The following alternatives have been identified in the PoA-DD:

Step 1:

Scenario 1 Business as Usual: The introduction of energy saving lighting technology and corresponding electricity savings are left to the market without further incentives.

Scenario 2 Same programmes without use of CDM with use of a different incentive mechanism. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity.

Scenario 3 Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism. Project implementation of LED lighting equipment through the support of a different mechanism, for instance a government subsidy policy.

⁶ The website of the DNA of The Republic of South Africa:

http://www.energy.gov.za/files/esources/kyoto/2012/CDM_Projects_Portfolio_19_June%202012.pdf (last accessed on 15/08/2012)

The completeness of the list of alternatives has been discussed with interviewees during the on-site visit and confirmed to be complete. Based on interviews and regulatory information there are no mandatory policies and/or regulations in South Africa which mandate the installation of LED lighting equipment at time of validation. Furthermore based on interviews performed, SQS concluded that the South African legislation does not prevent any of the identified alternatives to occur. Therefore it is SQS opinion, that the identified alternatives are in compliance with all mandatory applicable legal and regulatory requirements and, as there is no mandatory legislation stipulating the introduction or usage of LED lighting technology, all alternatives number 1 to 3 comply with mandatory laws and regulations.

Baseline identification for Greenfield project sites

According to the general guidelines to CDM SSC methodologies (EB 61 Annex 21, para. 19) Type II and III Greenfield projects (new facilities) may use a Type II and Type III small-scale methodology provided that they can demonstrate that the most plausible baseline scenario for this project activity is the baseline provided in the respective Type II and Type III small-scale methodology.

The baseline scenario of Greenfield projects has been demonstrated in the CDM SSC PoA-DD by following the steps provided by EB 61 Annex 21, para. 19:

Step 1:

Identify the various alternatives available to the project proponent that deliver comparable level of service including the proposed project activity undertaken without being registered as a CDM project activity. The PoA DD lists the following scenarios under Step 1:

1. Scenario 1: Business as usual. The introduction of energy saving lighting technology and corresponding electricity savings are left to the market without further incentives. It is defined as the most conservative common practice to be taken as the baseline scenario; to determine the installed lighting equipment that otherwise would have been installed (avoided equipment).
2. Scenario 2: Same programme without use of CDM, with use of a different incentive mechanism. Realise electricity savings through the introduction of large-scale LED technology as described in the PoA-DD, without the use of the Clean Development Mechanism with use of a different incentive mechanism. This is a potential alternative as required by EB 61 Annex 21, para. 19.
3. Scenario 3: Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism. Project implementation of LED lighting equipment through the support of a different mechanism, for instance a government subsidy policy. This is a potential scenario and found correct.

The CME defined that all LED lighting equipment under the PoA will fall into one of the four strata: Indoor Low-Power (<40 Watt), Indoor High-Power (≥ 40 Watt), Outdoor Low-Power (<20 Watt) and Outdoor High-Power (≥ 20 Watt). A corresponding table has been included in the POA-DD. A procedure for the establishment of a conservative baseline for Greenfield projects has been established in the CME operation manual, procedure CME/01/08 in line with the recommended values of illumination as per the Environmental Regulations for Workplaces 1987 (Government Notice 2281)⁷ [26]. The most conservative common-practice for each of these example locations would be the least electricity consuming lighting equipment producing the recommended values of illumination measured in lux as referenced in the Environmental Regulations for Workplaces 1987. To identify the classification of the lamps in question the CME procedure for determining stratification of LED lighting

⁷ <http://www.labour.gov.za/legislation/regulations/occupational-health-and-safety/regulation-ohs-environmental-regulation-for-workplaces/?searchterm> (last accessed on 10/08/2012)

equipment installed under the PoA will be used. The lamp classification is deemed plausible, reasonable and is consistent to the stratification as defined in the sampling plan (CME operation manual, procedure CME/01/08).

The Environmental Regulations for Workplaces 1987 [26] defined illumination as well as the procedure CME/01/08 provided in the CME Operation Manual [12] are in accordance with EB 61 Annex 21 para 9 and 19 respectively, and are deemed applicable to this type of equipment.

The most efficient (Watt) available non-LED lighting equipment that would fulfil the service level as defined in the Environmental Regulations for Workplaces 1987 will be determined. This is to be based on documentation of representative locations, where baseline lighting equipment is already installed in the same region as the project. The same region is defined as either: (a) within 200 km of the projects boundary; or (b) within the same city or town jurisdiction as defined by plan (CME Operation Manual, procedure CME/01/08). The project participant must document the type, wattage, and operating schedule of the baseline lighting equipment at the comparable location and assume this as the baseline for the project representative location. SQS concluded that the proposed approach and the procedure to determine the baseline scenario in case of Greenfield activities is conservative, provides a verifiable documentation of each future Greenfield site, is based on the relevant national legislation, and is following the guidance of an approved Type II methodology (AMS II-L.) which considers the same technology in similar applications (i.e. street lighting).

The following steps 2 to 4 have been checked by SQS to assess both, Brownfield and Greenfield baseline identification:

Step 2:

PoA-DD states that all identified alternatives are in line with host country's legislation. Based on regulatory information there are no mandatory policies and/or regulations in South Africa that mandates the installation of LED lighting equipment at time of validation. Furthermore based on interviews performed on site it is SQS opinion that the South African legislation does not prevent any of the above scenarios to occur. For any future CPA inclusion eligibility criteria No 10 ("Does the CPA rule out including facilities that are covered by an enforced government policy that includes mandatory adoption of LED lighting equipment?") guarantees that the evolving regulatory environment will be thoroughly investigated.

Step 3:

Eliminate and rank the alternatives identified in Step 2 taking into account barrier tests specified in attachment A to Appendix B of the simplified modalities and procedures of SSC CDM.

Scenario 1 (Business as Usual) is not prevented by any barrier. Please refer to clause 3.6.4 for the assessment of barriers.

Scenario 2 (Same programme without use of CDM, with use of a different incentive mechanism) would face technological barrier and other barriers such as barriers due to institutional, managerial resources and capacity to absorb new technologies. Please refer to clause 3.6.4 for the assessment of barriers.

Scenario 3 (Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism) This scenario in principle faces technological, managerial resources and capacity to absorb new technologies barriers. Please refer to clause 3.6.4 for the assessment of barriers.

Step 4:

The only remaining alternative is Scenario 1 (Business as usual) which is not the proposed project activity undertaken without being registered as a CDM programme of activity. This scenario is in line with the methodology AMS-II.C.

It is SQS' opinion that the proposed procedure for the determination of the baseline is in accordance with version 17 of the general guidelines for applying small-scale CDM methodologies (EB 61 Annex 21). The PoA DD provides a description of the identified baseline scenario as prescribed by the methodology; all applicable CDM requirements have been taken into account in the identification of the baseline scenario for the proposed CDM PoA and its CPA-001.

There are no requirements and procedures specified in the methodology AMS.II.C having precedence over the requirements of EB 61 Annex 21.

The energy displaced in the baseline is electricity. The baseline electricity consumption of each CPA is the product of two variables, the wattage of the replaced equipment or avoided equipment, and the operating hours. For Brownfield, the number and nameplate wattage of each replaced lamp is registered during installation of the new LED lighting equipment. A representative physical sample will be stored for verification by the DOE.

For Greenfield, the most efficient available non-LED lighting equipment that would fulfil the service-level as defined in the Environmental Regulations for Workplaces 1987 at an existing comparable location will be the baseline wattage. The operating hours are measured by monitoring the distributed LED lighting equipment *ex-post* with meters installed in the project sample group.

As per the SSC PoA-DD, a baseline shall be established on a project specific basis for each project site in a SSC CPA-DD. For the first specific SSC CPA-DD (CPA-001) only Brownfield sites will be included. Thus, the baseline scenario is correctly determined as the product of the electricity consumption of the old equipment replaced. The identified baseline scenario of CPA-001 is in accordance with the methodology. Its plausibility has been checked by supporting documents provided by the project participants and the CPA-001 owner [16-20]

Based on the above assessment, SQS hereby confirms that:

- (a) All the assumptions and data used by the project participants are listed in the PoA-DD and the first specific CPA-DD, including their references and sources;
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PoA-DD and the first specific CPA-DD;
- (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PoA-DD and the first specific CPA-DD;
- (e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

SQS's validation opinion is that procedure contained in the methodology to identify the most conservative baseline scenario has been correctly applied. The SSC PoA-DD provides a description of the procedures to identify the baseline scenario; all applicable CDM requirements have been taken into account in the identification of the baseline scenario both for the proposed CDM PoA and the CPA-001.

3.8.7 Algorithms and/or formulae used to determine emission reductions

Data / Parameter:	I_y
Data unit:	%
Description:	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the lighting equipment is installed.
Source of data used:	The data is obtained from the applicable local energy distribution company, or equivalent governmental organization.
Value applied:	<i>Ex-ante</i> estimate: 8.3%; to be determined <i>ex-post</i> .
Justification of the choice of data or description of measurement methods and procedures actually applied:	THE SSC-CPA's database identify for each LED lighting equipment the relevant distribution company (ESKOM). The most recent available publication is to be used. The average annual grid losses will be determined upon installation of each LED lighting equipment and will be fixed throughout the crediting period. I_y is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed grid losses are deviating more than 10% from the grid losses calculated at the start or at the previous renewal of the CPA's crediting period, a re-calculated grid loss needs to be used. This grid loss checking will guarantee that each CPA will use an grid loss following the development of the South African electricity market.
Means of validation:	Eskom year reports for 2010 and 2011 [50] the reference provided by PP was checked. Application of the L_y value to the CER calculation has been checked. Consistency of parameter description between PoA-DD, specific CPA-DD and generic CPA-DD has been verified.
Findings/ Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. Consistency of parameter between the PoA-DD and CPA-DDs is ensured. The average annual technical grid losses will be checked at the time of a CPA inclusion and at the renewal of the seven years crediting periods of each CPA and in case the actual (ESKOM) average annual technical grid losses differs more than 10% from the existing value the average annual technical grid losses value must be updated. This obligatory average annual technical grid losses checking will guarantee that each CPA will use an average annual technical grid losses factor following the actual development of the South African electricity market by using its most recent average annual technical grid losses factor.
Findings/ Conclusion CPA-001	The data has been checked and found consistent to that published by ESKOM. The 8.3%; will be checked at the time of renewal of the seven years crediting periods of the first CPA and in case the average annual technical grid losses factor differs more than 10% from the 8.3% used for the first crediting period the factor is updated.

The data and parameters used in the equations were validated in the following manner:

Baseline emissions

In Section E.6.2 of the PoA-DD and Section B.5.2 of the CPA-DDs the following formulae are used to calculate the baseline emissions:

Because the energy displaced is electricity, the emission baseline is determined as the product of the baseline energy consumption and the emission factor for the electricity displaced. Therefore, the SSC PoA DD correctly refers to Option 1 of the approved methodology AMS-II.C.

$$BE_y = E_{BL,y} * EF_{CO_2,ELEC,y}$$

Since the type of equipment is lighting, the parameter $Q_{ref,BL}$ (refrigerant used in the baseline to replace the refrigerant that has leaked) as well as its corresponding $GWP_{ref,BL}$ is not relevant. The formula applied in the

SSC-PoA-DD has been checked against Equation 1 of the approved methodology AMS-II.C. The formula is according to the methodology.

$$E_{BL,y} = \frac{\sum_i (n_i * p_i * o_i)}{(1 - l_y)}$$

The formula is according to the methodology.

Where:

BE_y	Baseline emissions in monitoring period y (tCO ₂ e)
$E_{BL,y}$	Energy consumption in the baseline in monitoring period y (kWh)
$EF_{CO_2,ELEC,y}$	Emission factor in monitoring period y calculated in accordance with "Tool to calculate the emission factor for an electricity system" (tCO ₂ /MWh). Under the PoA, the Grid Emission Factor (GEF) is calculated as per the "Tool to calculate the emission factor for an electricity system" using a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM). Data is sourced from the latest publicly available CO ₂ emission database by the Eskom ⁸ , the incumbent electricity company of South Africa. Refer to Annex 3 of the generic CPA-DD for how to calculate the GEF. The calculated GEF value is fixed ex-ante in the SSC-CPA. The grid emission factor is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed emission factor is deviating more than 10% from the emission factor calculated at the start or at the previous renewal of the CPA's crediting period, a re-calculated emission factor needs to be used. This emission factor checking will guarantee that each CPA will use an emission factor following the development of the South African electricity market. \sum_i The sum over the group of "i" devices replaced (Brownfield) and "i" devices avoided installation (Greenfield), for which the substituted energy efficient equipment is operating during the monitoring period of the project
n_i	The number of devices of the group of "i" devices replaced (Brownfield) and "i" devices avoided installation (Greenfield), for which the substituted energy efficient equipment is operating during the monitoring period
p_i	The power of the devices of the group of "i" devices replaced (Brownfield) and "i" devices avoided installation (Greenfield)
o_i	The average operating hours during the monitoring period of the devices of the group of "i" devices replaced (Brownfield) and "i" devices avoided installation (Greenfield). This is equal to parameter $o_{k,net,y}$ that is monitored throughout the crediting period.
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. AMS-II.C. Demand-side energy efficiency activities for specific technologies (version 13), of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable. Average annual technical grid losses is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed grid losses are deviating more than 10% from the grid losses calculated at the start or at the previous renewal of the CPA's crediting period, a re-calculated grid loss needs to be used. This grid loss checking will guarantee that each CPA will use an grid loss following the development of the South African electricity market.

The description of the parameters is according to the methodology.

⁸ ESKOM website: <http://www.Eskom.co.za/live/index.php> and emission database: http://www.Eskom.co.za/live/click.php?u=%2Fcontent%2FCEF_CalculatorFINAL2010-2011%7E1.xls&o=Item%2B236&v=454b33 (last accessed on 17/07/2012)

Project Emissions

Because the energy used is electricity, the project emissions are correctly determined in the SSC PoA-DD and the CPA-DDs as the product of the energy consumption of the project and the emission factor for the electricity displaced.

$$PE_y = E_{p,y} * EF_{CO_2,ELEC,y}$$

Equation 3 in Section E.6.2. of the PoA-DD and in Section B.5.2. of the CPA-DDs is equal to Equation 5 in the methodology.

$$E_{p,y} = \sum_k (n_k * p_k * o_k) / (1 - l_y)$$

The formulae above are correctly selected and displayed in Section E.6.2. of the PoA-DD and in Section B.5.2. of the CPA-DDs

Where:

PE_y	Project emissions in monitoring period y (tCO ₂ e)
$E_{p,y}$	Energy consumption due to the project in monitoring period y (kWh)
$EF_{CO_2,ELEC,y}$	Emission factor in monitoring period y calculated in accordance with “Tool to calculate the emission factor for an electricity system” (tCO ₂ /MWh). The grid emission factor is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed emission factor is deviating more than 10% from the emission factor calculated at the start or at the previous renewal of the CPA’s crediting period, a recalculated emission factor needs to be used. This emission factor checking will guarantee that each CPA will use an emission factor following the development of the South African electricity market.
Σk	The sum over the group of “ k ” LED lighting equipment that is operating during the monitoring period of the project
n_k	The number of devices of the stratum of “ k ” LED lighting equipment that is operating during the monitoring period. This parameter will be corrected with the monitoring data on failure of devices throughout the monitoring period
p_k	The power of the devices of the stratum of “ k ” LED lighting equipment that is operating during the monitoring period
$o_{k,net,y}$	The average operating hours during the monitoring period of the devices of the stratum of “ k ” LED lighting equipment. This parameter will be corrected with the monitoring data on replacement by maintenance of devices throughout the monitoring period (see below)
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. According to AMS-IL.C. Demand-side energy efficiency activities for specific technologies (version 13), 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable. Average annual technical grid losses is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed grid losses are deviating more than 10% from the grid losses calculated at the start or at the previous renewal of the CPA’s crediting period, a re-

calculated grid loss needs to be used. This grid loss checking will guarantee that each CPA will use an grid loss following the development of the South African electricity market.

The description of the parameters is according to the methodology. The values for operating hours used for calculating baseline and project emissions are determined through a metered sampling process at PoA level. The size of the project sample group used for arriving at these values is determined taking into consideration the latest version of the Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5) and latest Standard for sampling and surveys for CDM project activities and PoAs (EB 69, Annex 4). The end-users included in the survey will be randomly selected from the database of participating end-users. The results obtained from the sampling process will be directly extrapolated across the entire population of end-users participating in the PoA and its respective CPAs. The increase in sample size for the PoA will be identified and documented before the start date of crediting period of each SSC-CPA.

A group of non-metered LED lighting equipment will be randomly identified on basis of the project database and will be subject to an annual check to determine the mean failure rate of the installed equipment.

The measured operating hours are corrected by the percentage of LEDs replaced ($r_{failure,k,y}$) times the down time (per stratum) for each type of LED lighting equipment ($of_{k,y}$).

The operating hours are to be corrected by the failure rate and the outage factor as follows:

$$O_{k,net,y} = O_{k,y} * (1 - (r_{failure,k,y} * of_{k,y}))$$

Where:

$O_{k,net,y}$	The average operating hours during the monitoring period of the devices of the stratum "k" of LED lighting equipment in year (y)
$O_{k,y}$	The metered operating hours of the devices of the stratum "k" LED lighting equipment in year (y)
$r_{failure,k,y}$	Lamp Failure rate is the % of lamps that have failed and are replaced within stratum "k" LED lighting equipment with comparable LED lighting equipment as part of a warranty scheme, or part of a regular maintenance scheme.
$of_{k,y}$	Outage factor of LED lighting equipment within stratum "k" that discounts the operating hours, based on elapsed time between the failure of the LED lighting equipment and the replacement.

The method is appropriate considering para. 13 (a) and 14 of the approved SSC methodology AMS.II.C. The applied sampling techniques and requirements are described in Section 3.10.2

Leakage

The monitoring plan includes a whether check if the number of project activity equipment distributed by the project and the number of scrapped equipment are equal and no leakage occurs. For this purpose scrapped equipment will be stored until such correspondence has been checked. The scrapping of replaced equipment will be documented and independently verified. This is according to the conditions (as of para.17) that apply for use of AMS.II.C in a project activity under a programme of activities.

Emission Reductions

The emission reduction achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.

$$ER_y = BE_y - PE_y - LE_y$$

Where:

- ER_y Emission reductions from avoided electricity consumption in year y (tCO₂/y)
 BE_y Baseline emissions from electricity consumption in year y (tCO₂/y)
 PE_y Project emissions from electricity consumption in year y (tCO₂/y)
 LE_y Leakage emissions in year y (tCO₂/y). The leakage effect of the use of the replaced equipment in another activity can be neglected if the replaced equipment is scrapped.

Equation and description of the parameters are according to the methodology

3.8.8 Data and parameters that are available at validation

Data / Parameter:	EF_{CO2,ELEC,y}
Data unit:	kgCO ₂ /kWh
Description:	Emission factor for electricity displaced from the Eskom grid
Source of data used:	3.8.8.1 The latest available Eskom (South Africa's incumbent electricity company) data is applied. The power production related data is published on the Eskom website ⁹ [11]
Value applied:	1.01
Justification of the choice of data or description of measurement methods and procedures actually applied:	Project developer has obtained latest data from governmental sources (Eskom) and applied calculation methodology specified in "Tool to calculate the emission factor from an electricity system (version 2.2.0)" (see Annex 3 for detailed calculation methodology). The emission factor is fixed for the lifetime of the PoA. If at time of (a) inclusion of PoA or (b) at the time of the renewal of a crediting period of each CPA, the fixed emission factor is deviating more than 10% from the emission factor calculated at the start or at the previous renewal of the CPA's crediting period, a re-calculated emission factor needs to be used. This emission factor checking will guarantee that each CPA will use an emission factor following the development of the South African electricity market.
Means of validation:	The conformity of the Eskom database with the Tool to calculate the emission factor from an electricity system (version 2.2.0) has been validated. Consistency of parameter description and value applied between PoA-DD, specific CPA-DD and generic CPA-DD has been verified.
Findings/ Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, source of data and justification of choice of data are in accordance with the approved methodology. Consistency of parameter between the PoA-DD and CPA-DDs is ensured. The grid emission factor will be checked at the time of a CPA inclusion and at the renewal of the seven years crediting periods of each CPA and in case the actual

⁹ ESKOM grid factor calculation for CDM projects

http://www.Eskom.co.za/live/click.php?u=%2Fcontent%2FCEF_CalculatorFINAL2010-2011%7E1.xls&o=Item%2B236&v=454b33
(last accessed 31/10/2012)

		(ESKOM) grid factor differs more than 10% from the existing value the grid factor value must be updated. This obligatory emission factor checking will guarantee that each CPA will use an emission factor following the actual development of the South African electricity market by using its most recent grid factor.
Findings/ CPA-001	Conclusion	The parameter is fixed <i>ex-ante</i> (no need to monitor) during the crediting period with a value of 1.01 kgCO ₂ /kWh. The DOE's validation opinion is that the 1.01 kgCO ₂ /kWh value is justified, conservative and appropriate. The grid emission factor will be checked at the time of renewal of the seven years crediting periods of the first CPA and in case the grid factor differs more than 10% from the 1.01 kgCO ₂ /kWh used for the first crediting period the factor is updated.

Validation and findings related to the values applied of data and parameters monitored are listed in Section 3.5.7. (Monitoring plan).

Based on the validation findings listed above SQS concludes regarding the algorithms and/or formulae used to determine emission reductions:

Assumptions

It is the opinion of SQS, that all assumptions and data used by the project participants are listed in the PoA-DD, including their references and sources.

References

The DOE's validation opinion is that all documentation used by project participants as the basis for assumptions and source of data for the calculation of emission reductions are correctly quoted and interpreted in the PoA-DD.

Reasonableness

The DOE's validation opinion is that all values used in the CPA-DD are justified and considered reasonable and appropriate in the context of the proposed CDM PoA.

Methodology application

The DOE's validation opinion is that the baseline methodology and corresponding tools has been applied correctly to calculate project emissions, baseline emissions, leakage, and emission reductions.

Reliability

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PoA-DD/ CPA-DD.

Ex-ante calculation of the grid factor

The Emission Factor is - in accordance with "Tool to calculate the Emission Factor for an electricity system" - based on calculating the combined margin (CM) according to the procedures prescribed in the tool. The applied emission factor for the South African electricity system used in the calculations is calculated from the latest available (2010/2011) power sector data publicly available from Eskom. SQS confirms that the grid Emission Factor calculation was based on the most recent data available in line with the requirements of the applicable Tool. The grid factor is fixed for the lifetime of the PoA; however in case the grid factor changes more than 10% as compared to the value of 1.01 kgCO₂/kWh the grid factor must be updated at the time of crediting period renewal. In practice this implies that the ex-ante calculated grid emission factor will be checked by the CME at the time of the renewal of the seven years crediting periods of each CPA.

3.9 Additionality of the Programme of Activity

Additionality is demonstrated using the criteria outlined in attachment Appendix A- B of the simplified mo-

dalities and procedures for small-scale CDM project activities. To ensure a well-developed discussion of additionality and substantiate that the technological barrier & institutional, managerial resources and capacity to absorb new technologies barriers are preventing implementation of the project without CDM revenues, elements from the 'Combined tool to identify the baseline scenario and demonstrate additionality' (version 04.0.0) are used. As the project is small-scale and as the pertaining methodology AMS-II.C (version 13) does not require the use of the tool; its usage is not obligatory. As per the General Guidelines to SSC CDM methodologies (version 17) the following documents provided additional guidance or guidelines: EB35, Annex 34: Non-binding best practice examples to demonstrate additionality for SSC project activities; EB50, Annex 13: Guidelines for objective demonstration and assessment of barriers.

Given that the LED's kick-off PoA implements a small-scale technology, i.e. efficient lighting equipment, EB63 Annex 12: Guidelines on Common Practice (version 01.0) is not used, since it is considered not applicable to the type of project activity implemented under this programme.

As explained above, the PoA-DD additionality is demonstrated by steps borrowed from the Combined tool to identify the baseline scenario and demonstrate additionality' (version 04.0.0) these are as follows:

Step 0. Demonstration that a proposed project activity is the First-of-its-kind (not applied for the PoA);

Step 1. Identification of alternative scenarios;

Step 2. Barrier analysis;

Step 3. Investment analysis (not applied for the PoA);

Step 4. Common practice analysis

Within SSC projects the barrier analysis approach can be carried out in different ways including the techniques that resemble the elements of the Combined Tool/Additionality Tool. The SSC guidelines referred to in para 7 of the "General guidelines to SSC CDM methodologies", namely EB 35 Annex 34 and EB 50 Annex 13 do not provide guidance on how to conduct the barrier analysis neither the Tools for conducting the barrier analysis. Therefore the elements of the Combined Tool/Additionality Tool, have been regularly used by registered SSC projects to substantiate that the prevailing/common-practice & technology barrier is the decisive additionality factor.

The proof of additionality was checked by desk-review including cross- and plausibility-checks. Information with regard to additionality was taken from the identification of alternative scenarios, the barrier analysis and the common practice analysis, and has been cross-checked by SQS. Additionality is demonstrated on PoA level and addressed as eligibility criteria at CPA level. This is in accordance with EB 65 Annex 3.

As confirmed during the on-site visit and by follow up interviews the proposed PoA is a voluntary coordinated action initiated by the CME, designed to offer supporting platform for LED lighting equipment. The PoA will be operated from revenues resulting from the sale of carbon credits. The programme will enable Lemnis Lighting B.V, the manufacturer of LEDs and distributors to use additional CER income for a faster roll-out of LED lighting technology and to compete with less energy-efficient products. The LED's kick-off programme is an initiative based on expected CER revenues. These revenues make it possible for the CPAs under the platform to realise a faster and/or broader roll-out of LED lighting technology. End-users and other entities participating in SSC-CPAs under the PoA will do so through a voluntary collaboration with the CME.

3.9.1 *Starting date of a PoA/CPA*

Though the DOE is not required to assess prior consideration of CDM for PoAs in line with EB 62 Annex 13 requirements, it is confirmed that the first component of the programme will commence after the start date of validation, the date on which the CDM-PoA-DD was published for global stakeholder consultation, 24/12/2010. The starting date of both the PoA and the CPA-0001 is set as 02/10/2012.

The CDM-SSC-PoA-DD was published for global stakeholder consultation 24/12/2010. The CDM-SSC-PoA-DD and CDM-SSC-CPA-DD confirm that there will be no start date of any CPA prior to the first date of publication for global stakeholder consultation (24/12/2010). The generic and the specific CPA-DD correctly state, that the start date of any CPA is not, or will not be, prior to the commencement of validation of the programme of activities, i.e. the date on which the CDM-PoA-DD was published for global stakeholder consultation, 24/12/2010. The CPA start date has been addressed by CPA eligibility criteria No. 6. As evidence every prospective CPA operator shall provide the purchase order for the first LED lighting equipment to be installed for the first end-user under a CPA after such purchase order has been finalized as defined by CME Operational Manual "Annexure 1: Confirmation to PoA stated CPA Eligibility Criteria"

The starting date of the CDM programme activity is the earliest date at which either the implementation or construction or real action of a programme activity begins. In the PoA-DD the starting date is set as 02/10/2012 with a length of 28 years.

The starting date of CPA-001 is set as 02/10/2012, an expected date of the first LED lighting equipment purchase order under the activity, which is after the date on which the CDM-PoA-DD is first published for global stakeholder consultation (24/12/2010). The starting date of the crediting period of the first CPA shall be the date of its inclusion in the registered PoA or any date thereafter; the starting date of the crediting period is set as 30/10/2012, or the date of including the CPA- 001 in the registered PoA.

It is SQS' opinion that the PoA starting date and start date of any CPA to be included in future is appropriately proven and supported by evidence. Both PoA and CPA start dates are in accordance with EB 65 Annex 3, para. 14 d and the latest Glossary of CDM Terms.

3.9.2 Identification of alternative scenarios

The identification of alternatives is elaborated in the PoA-DD according to the approved methodology and the General Guidelines to SSC CDM methodologies (version 17). The following alternatives have been identified in the PoA-DD:

Scenario 1 Business as Usual: The introduction of energy saving lighting technology and corresponding electricity savings are left to the market without further incentives.

Scenario 2 Same programmes without use of CDM, with use of a different incentive mechanism. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity.

Scenario 3 Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism. Project implementation of LED lighting equipment through the support of a different mechanism, for instance a government subsidy policy.

The completeness of the list of alternatives are assessed in chapter 3.5.4 of this report and confirmed to be complete.

Based on regulatory information published by the South African Government¹⁰ there are no mandatory policies and/or regulations in South Africa that mandates the installation of LED lighting equipment at time of validation [27]. Furthermore, based on the regulatory environment SQS concluded that the South African legislation does not prevent any of the identified alternatives to occur. Therefore it is SQS opinion that the identified alternatives are in compliance with all mandatory applicable legal and regulatory requirements and, as there is no mandatory legislation stipulating the introduction or usage of LED lighting technology, all alternatives number 1 to 3 comply with mandatory laws and regulations.

¹⁰ Website of the Department of Energy, Government of South Africa : http://www.energy.gov.za/files/policies_frame.html (last accessed on 10/08/2012)
http://www.energy.gov.za/files/policies/Energy_Efficiency_and_Demand_Side_Management_Policy.pdf (last accessed on 10/08/2012)

3.9.3 Barrier analysis

Introduction - the efficiency paradox

Energy efficiency has been recognized as one of the most important tools for delivering both climate and energy security whilst supporting sustainable economic growth both within OECD countries and in emerging economies. However, despite these benefits, investments in energy efficiency have lagged far behind the vast potential. The reluctance of firms to invest in energy efficient technologies has been recognized since the late 1970s and has been dubbed the “efficiency paradox”. A substantial body of literature has developed in the past quarter century on its causes. The main challenges identified are finance, communications, and changing traditional behaviour. Project opportunities tend to be relatively small scale and dispersed, transaction costs can prove daunting if no mechanisms are put in place to take advantage of similarities among projects and bundle them. Some form of financial intermediation is usually required, unless enterprises use their own funds. Typically, therefore, implementation of energy efficiency projects involves interaction of both financing entities and technical experts with end-users. Project delivery requires very efficient contracting to achieve this without driving up transactions costs—a challenge in any country, but especially where market institutions may be relatively weak, causing greater insecurities in contracting, as in South Africa.

The innovative nature of LED lighting equipment, combined with their higher cost, low public awareness, lack of support for the introduction create a strong preferences for continued utilisation of existing lighting equipment. The LED's kick-off PoA proposes a solution to overcome these barriers.

Barriers identified

Based on the relevant requirements of attachment A of Appendix B (EB 63 Annex 24) of the “Simplified modalities and procedures for small-scale CDM project activities” project participants provided an explanation to show that the project activity would not have occurred anyway due to the following barriers:

- Technological barrier: Currently the LED technology is the most advanced energy saving lighting technology. It substitutes CFLs as the most innovative solution by being twice as efficient with the same output and no mercury. There are currently no other technologies on the market that offer equivalent or better energy savings and lifetime than LED technology
- Access to finance barrier. Prevailing common-practice sees end-users not investing in energy efficient LEDs, as their capital investment requirements are too high compared to other options. Investment in energy efficiency is not seen as a priority. This is due to the fact that management will prefer projects that increase revenue rather than reduce costs. Increasing revenue is seen as a more important performance indicator. Moreover, LEDs are not considered as collateral by financing institutions therefore financial lease is prevented.
- Other barriers (lack of demand side management incentive measures)

In order to validate the barrier analysis and to determine whether the barriers are real SQS used the following guidance: EB35, Annex 34: Non-binding best practice examples to demonstrate additionality for SSC project activities and EB50, Annex 13 Guidelines for objective demonstration and assessment of barriers.

Based on its local and sectoral expertise, it is SQS' opinion that the set of barriers are real and their existence is substantiated by independent and reputable sources of data. Therefore the barrier analysis performed is deemed credible. The barriers do not prevent the implementation of Scenario 1 (business as usual), which is the identified baseline scenario.

Technological Barrier

The performed cross-check with technical literature supports the argumentation of the PoA-DD. The barrier is objectively presented in the PoA-DD and deemed real. It will prevent the implementation of this type of proposed programme activity and each of its component project activities. The barrier does not prevent the implementation of the following alternatives:

Scenario 1: Business as usual is a less technologically advanced alternative to the project activity, involves lower risks due to the performance uncertainty and low market share of the new LED technology adopted for the project activity and so would have led to higher emissions.

Scenario 2: the introduction of large-scale LED technology retrofits with use of a different incentive mechanism.

Scenario 3: Programme achieving the same results with different technology, with use of a different incentive mechanism.

LED lighting equipment is a relatively new technology that has changed design practices in the lighting industry, it requires new expertise not previously used in fixture design. Fixture design consisted mostly of mechanical design, and the electronic components (e.g. ballasts) were integrated at a later stage. LED luminaires design needs an integrated approach. The luminaires have to be designed for a particular light source, unlike in the design of traditional fixtures using replaceable or interchangeable light sources.

Since there are new technologies that are difficult to develop in-house, LED luminaires design needs collaboration with outside experts/consultants with an understanding of the design of drivers and thermal management.

As a result, for fully functional LED lighting equipment, including drivers, heat sinks, etc., the cost can easily be more than 30 times higher than conventional sources.

In established lighting technologies the lighting fixture is permanent and the lamp is replaced. The perceived marginal cost of a solid-state luminaire is more than the replacement cost of a lamp. This is an important barrier to solid-state lighting. At the current prices of LED luminaires, it is difficult to convince customers of the energy and cost savings, compared with cheaper conventional lighting technologies, particularly linear or compact fluorescent lamps. The aforementioned factors constitute a technological barrier, for the uptake of LED lighting equipment.

The documentary proof as well as the demonstration of the barrier has been cross-checked with technical literature:

- Pittsburgh University life cycle assessment of different street lighting technologies [34]
- Lighting design guide to energy efficient lighting [35]
- U.S. DOE LED Street Lighting report on assessment of the performance of LED luminaires in a street lighting application on public roadways in San Francisco, California [36]

The technical literature confirms the argumentation in the PoA-DD, in particular the problems associated with fixture design/replacement, thermal management, and relatively high initial costs in comparison to conventional lighting technologies. Therefore it is SQS' opinion that the barrier demonstrated in an objective manner, that the barrier is real and prevents this type of proposed programme activity.

Access to finance barrier

End-users are facing multiple disincentives for investing in energy efficient LEDs, as their capital investment requirements are far higher compared to other options. Investment in energy efficiency is not seen as a priority as conventional managerial decision making will always prefer projects that increase revenue rather than reduce operational costs. Increasing revenue is seen as a more important performance indicator even in the commodity products characterising the CPA-001. SQS has interviewed South African financial experts from advisory firm Deloitte and received a full confirmation [15] with respect to the access to finance barrier with respect to energy efficient lighting equipment.

For a product that provides the same service-level for a substantially higher initial investment price than its comparable alternatives, financing is a key valid barrier, especially if it is perceived as maintenance rather than a product investment. Market acceptance of efficient lighting equipment is undermined with this feature of the

product and the conventional decision making patterns. Due to the general asset-based lending practice of financial institutions and the difficulties of realistic assessment of energy savings for cash-flow based lending a considerable barrier exists for loan financing of LEDs.

Eligibility criteria No. 11 “Is the market penetration of LED lighting in South Africa below 33% at the time of inclusion of the CPA?” indirectly addresses this market acceptance feature based on Rogers’ (1995) Innovation-Decision Process Model and technology diffusion curve that incorporates the willingness to pay for a new, innovative product.

South Africa’s energy efficiency strategy [27] refers to deferring the necessity for additional power generation capacity, however this macro goal is not internalised for the entities that decide on the installation of energy efficient lighting equipment. It can be concluded that the traditional decision making approaches characterising lighting equipment decisions coupled with a relatively low price of electricity [29] results in a real barrier for financing LED investments.

Other barriers - financial resources

In addition to the access to finance barrier the PDD lists other barriers that are of financial nature in their essence and would hinder alternative financial mechanisms to finance energy efficiency measures, such as LED introduction. These mechanisms and the barriers they are facing are as follows:

- Financial lease – due to the fact that LEDs – as small value, numerous items – are not considered as collateral, financing is not possible through this traditional channel applicable for larger values single items (transport vehicles, property etc) The cost of collection of LED equipment exceeds its value. This lack of collateral nature of LEDs is translated into an interest rate that makes a financial lease unviable or not possible at all.
- Energy service company – ESCOs are at their early stage of development despite ESKOM’s support for ESCOs. A comprehensive 2011/12 study of ESCOs [30] funded by KfW and executed by PWC and IDC (South African National Development Finance Institution) has identified the key factors for growth of the ESCO sector the increase of energy prices, and the potential to access to finance at competitive rates. The lack of collateralisation / as described for financial lease above – makes it hard for ESCOs to raise the necessary finance for their activities.
- Subsidies – though subsidies exists they are scarce for energy efficient equipment and no specific programme exists for LED lighting. The so-called ESKOM “Standard Offer” is a mechanism used by ESOM for acquiring demand-side savings under which Eskom shall pay for verified energy savings using a pre-determined and pre-published rate in c/kWh for the implementation of an approved technology. This is not a product subsidy scheme, but a scheme that incentivises through the tariff payable by entities installing energy efficient equipment [31].

The PoA eligibility criteria No. 9 guarantees that for each future CPA these barriers are thoroughly assessed and the CPA is included in case they demonstrate that the project component activity would have not occurred due to at least one of the access to finance, technological or other (financial resources) barriers

SQS has checked the plausibility of the barriers with the following reputed documentary proofs:

- Strategies Unlimited report, 2nd edition, February 2011: LED Luminaries, Market Analysis and Forecast [39]. Chapter 8 “Outdoor Area Lighting”, in particular Section 8.3.7 entitled “Challenges”.
- LEDs Magazine Nov. Dec. 2010: LED lighting at the crossroad: country road or express way [40]
- Jackson, J. (2010): Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 p. 3865-3873 [41].
- REEEP Energy Efficiency Coalition [42].

- Taylor et al. (2008): Financing energy efficiency; lessons from Brazil, China, India and beyond, World Bank [43].
- K. Heer (2011): The challenge of up-scaling efficient lighting in the developing world, University of Utrecht [44].
- Okay, N. and Akman, U. (2010): Analysis of ESCO activities using country indicators, in: Renewable and Sustainable Energy Reviews, Volume 14, p.2760-2771 [45].
- Painuly, J.P. et al. (2003): Promoting energy efficiency financing and ESCOs in developing countries: mechanisms and barriers, in: Journal of Cleaner Production, Volume 11, p.659-665 [46].
- Ansar, J. and Sparks, R. (2009): The experience curve, option value, and the energy paradox, in: Energy Policy Volume 37, p.1012-1020. [47]

The scope specific literature confirm the argumentation in the PoA-DD, in particular the problems associated with demand side management and its financing challenges as a new area in South Africa; technological barriers associated with the novel LED technology: lack of understanding and expertise in the management and implementation of such programmes using a new untested technology and lack of institutional capacity. The literature shows that DSM initiatives are still in nascent stage, existing initiatives by ESKOM and ESCOs are either pilot programmes or demonstration projects, there is very little quality information available about the existing schemes and no information is available on post implementation project performance.

Therefore it is SQS' opinion that the barriers are demonstrated in an objective manner, that the barriers are real and prevent this type of proposed programme activity.

Other barriers - capacity to absorb new technologies

As eligibility criteria No 11 "Is the market penetration of LED lighting in South Africa below 33% at the time of inclusion of the CPA?" explicitly focuses on the way how a new technology - LED lighting – is absorbed and gains acceptance in the host country. SQS has evaluated its underlying rationale that overlaps with the "Capacity to absorb new technologies" of the "other barriers" section of Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities. It must be noted this barrier is not explicitly listed in the PoA-DD.

Project site (business) owners are unwilling to make large up-front investments for the installation of energy efficient technology despite the forecasted electricity shortage, increased electricity prices and cost of maintenance. The potential for energy savings and attractive payback period is also not a sufficient catalyst for stimulating the required level of implementation. The LED's kick-off PoA offers several options to realise a faster roll out of LED lighting technology.

Practice shows commercial end-users are not investing in energy efficient LED lighting equipment for three main reasons:

- a) Their capital investment requirements are too high compared to other investment options. The payback period, IRR and NPV are not attractive enough for commercial users to make such an investment. A recent article by McKinsey & Company refers to a survey conducted by McKinsey & Company in 2010, which showed that industry leaders agreed that the top roadblock for the uptake of LED lighting equipment is that LED lighting equipment unit costs are too high. The article notes that LED lamps are four times the price of an equivalent CFL in the 40-watt equivalent product range [41].
- b) If an efficiency project does have an attractive financing period, IRR, NPV etc. the project will still have low priority. Management will prefer projects that increase revenue rather than reduce costs. Increasing revenue is seen as a more important performance indicator [43].
- c) Scientific studies have consistently found that the average implicit discount rates firms use for investing in energy saving technologies are much higher than seems plausible, even when adjustments are made for risk [47].

The barriers are presented in an objective manner and are real obstacles for LED lighting equipment to be implemented. The following baseline scenarios are thus prevented by the barriers discussed above:

- *Scenario 2:* Same programme without use of the CDM with use of a different incentive mechanism. This scenario faces all the identified barriers: access to finance and technological barrier
- *Scenario 3:* Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism. This scenario in principle faces access to finance barrier.

Scenario 1: Business as usual, the introduction of energy-saving lighting technology and corresponding electricity-savings are left to the market without further incentives is not hindered by the identified barriers.

Does CDM alleviate the identified other barriers?

The implementation of LED lighting equipment in South Africa faces access to finance and technological barriers. The registration of LED's kick-off PoA under the CDM will enhance market entry of high quality LED lighting equipment products. The programme will be financed by CER revenues.

3.9.4 Investment analysis

In line with attachment Appendix A-B of the simplified modalities and procedures for small scale project activities (version 08) no investment analysis has been conducted. SQS confirms that there is no obligation to conduct an investment analysis.

3.9.5 Common practice analysis

Based on the fact that the PoA implements small-scale technology the EB63 Annex 12: Guidelines on Common Practice (version 01.0) does not have to be applied. However, the project participants performed a common- practice analysis.

SQS has checked the common-practice analysis on LED utilisation in South Africa to ensure that the PoA is not aiming at promoting an activity that is already common-practice despite the barriers identified and validated previously.

SQS confirmed that the LED lighting equipment penetration rate is below any measurable rate of the total lighting market. This results in a share of LED lighting (F) of 0.00% and can be deemed a marginal proportion of the total market.

Therefore the conclusion that the penetration of energy efficient lighting in South Africa is very low and more specifically, that LED lighting equipment has hardly penetrated the South African lighting market, is found to be correct.

SQS performed research on similar project activities in South Africa. No other activities or programmes similar to the proposed PoA, using the same technology within the geographical scope as defined above, have been identified at time of validation. Therefore it is SQS' opinion that similar and operational projects, are not already widely observed and commonly carried out in the defined geographic scope. Furthermore, the validation team performed a project search on UNFCCC CDM website. No other CDM activities or programmes similar to the proposed PoA using the same technology within the geographical scope as defined above have been identified. Therefore SQS concludes that the proposed programme is not common-practice.

The barrier analysis proves that the penetration of the LED technology is insignificant and therefore the first CPA is additional. This is in line with the applicable SSC guidance (EB35, Annex 34 and EB50, Annex 13).

Any future CPA can only be included if the market penetration is below a set benchmark for market penetration. For the LED's kick-off PoA, a threshold for market penetration was set at 33%. Meaning that as long as the market penetration of LED lighting equipment does not reach 33%, LEDs are not regarded as common-practice.

The threshold of 33% market penetration chosen by the CME is based on Rogers' [38] Innovation-Decision Process Model and technology diffusion curve, where the innovators represent 2.5% of the market, the early adopters another 13.5% and the early majority 34%. The 33% includes half of the early majority since this category represents all sections of an economy whilst the innovators and early adopters are typically only the younger, higher-educated, or better-informed part of the market. It is SQS's opinion that the threshold is based on a reputable economic model.

The threshold of market penetration is included in the eligibility criteria for CPA inclusion, meaning that for each CPA it has to be proven that market penetration is below 33% in order to be included. For each CPA this is to be demonstrated by:

- a) Publicly available regional or national statistics or
- b) Alternatively (if a) is not available) the opinion/statement from at least one independent expert

Conclusion on the assessment and demonstration of additionality

The registration of LED's kick-off PoA under the CDM will overcome the identified barriers and enhance market entry of high quality LED lighting equipment products. Based on the above analysis of alternative scenarios, barriers and common practice the PoA and CPA-001 are considered to be additional.

Future CPAs to be included in the PoA require to demonstrate additionality as delineated in the corresponding eligibility criteria. It is the opinion of SQS, that in the absence of the CDM the proposed voluntary measure would not be implemented.

3.10 Monitoring plan

The monitoring plan described in detail in the PoA-DD, in the CPA-DDs as well as the additional monitoring procedures defined in the CME Operational Manual have been thoroughly checked by a desk-review with all relevant EB guidelines, applicable tools and requirements of AMS-II.C and EB 69 Annex 4.

3.10.1 Values applied of data and parameters monitored by each CPA

Data / Parameter:	n_i
Data unit:	Number
Description:	Number of replaced equipment collected (Brownfield) and number of avoided equipment installed (Greenfield) under SSC-CPA 001
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.1 (CPA-001)	75 000
Description of measurement methods and procedures to be applied:	At the time of LED lighting equipment installation, the number of replaced equipment (Brownfield) or avoided equipment (Greenfield) will be recorded. A distinction between Brownfield and Greenfield installation will be made in the data entries, which allows for allocation at a later stage.
QA/QC procedures to be applied:	A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data-entry errors.
Any comment:	For the calculation of the emission reductions both Brownfield and Greenfield number are placed under the same parameter for simplicity.
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001.
Findings/Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/Conclusion CPA-001	The n_i value applied for the ex ante calculation of emission reductions in CPA-001 is based on the number of replaced equipment at end-user site. The value of the parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation; it's SQS' opinion that the estimate provided in the specific CPA-DD for these data and parameters is justified, conservative and reasonable

Data / Parameter:	n_{scrapped}
Data unit:	Number
Description:	Number of replaced equipment collected (Brownfield) that is scrapped under SSC-CPA 001
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.1 (CPA-001)	<i>ex-ante</i> estimate: 75 000; to be determined <i>ex-post</i>
Description of measurement methods and procedures to be applied:	As per the methodology AMS-II.C Demand-side energy efficiency programmes for specific technologies (version 13) replaced equipment (old lamps) must be scrapped, in order to prevent leakage and ensure correct disposal. The contracted scrapping entity will provide independently verified data on the scrapped equipment. This allows for a check whether the number of project activity equipment distributed by SSC-CPA 001 and the number of scrapped equipment correspond with each other. The scrapping of replaced equipment will be documented and independently verified
QA/QC procedures to be applied:	A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data-entry errors.
Any comment:	-

Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001.
Findings/Conclusion PoA-DD	<p>Project participants have a procedure for collecting and/or storing including scrapping, as per AMS-II.C version 13 para. 17 under the CME Operational Manual procedure CME/01/12 and PoA-DD E.7.1. The CME will ensure this process is followed by including this procedure in the relevant contracts between CME and CPA owner and between CPA owner and scrapping entity. In addition, the CME management system provides clear definition of roles, responsibilities and duties of entities involved [procedure CME 02/05].</p> <p>A representative sample of the replaced devices (including the number and "power") will be recorded to allow for physical verification by the DOE. The number and "power" of the replaced equipment to be recorded for physical verification is based on the identified samples within the metered sampling survey (Smetered,k). That means, if a meter is installed the replaced lamp is collected and stored for verification.</p> <p>It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.</p>
Findings/Conclusion CPA-001	The procedure as defined in the PoA-DD as well as in the CME Operational Manual will enable the verifying DOE to check whether the number of project activity equipment distributed by SSC-CPA 001 and the number of scrapped equipment correspond with each other. The parameter is monitored during implementation (ex-post) and will be available after validation. It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is justified, conservative and reasonable.

Data / Parameter:	n_k
Data unit:	Number
Description:	Number of installed LED lighting equipment under SSC-CPA
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.1 (CPA-001)	<i>ex-ante</i> estimate: 75,000; to be determined <i>ex-post</i>
Description of measurement methods and procedures to be applied:	At the time of installation, the number of LED lighting equipment installed will be recorded and subsequently entered into the database of SSC-CPA 001
QA/QC procedures to be applied:	A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data entry errors.
Any comment:	-
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001.
Findings/Conclusion PoA-DD	<p>AMS.II.C requires that aggregate energy savings by a single project activity may not exceed 60 GWh per year. PoA CPA eligibility criteria No.15 and PoA-DD Section E.2 justification of the choice of the methodology consider this requirement of the methodology Therefore it is assured on PoA level that the number of installed LED lighting equipment under each SSC-CPA will not exceed the equivalent of 60 GWh per year. It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.</p>

Findings/Conclusion CPA-001	The n_k value applied for the ex ante calculation of emission reductions in CPA-001 is based on the number of replaced equipment at the first end-user site (75 000). The parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation. It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is justified, conservative and reasonable.
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Data / Parameter:	p_i
Data unit:	Watt
Description:	Power of the replaced equipment (Brownfield) or the most conservative common practice power of the avoided equipment installed (Greenfield) in the baseline.
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.1 (CPA-001)	<i>ex-ante</i> estimate of the replaced equipment: (2*36 Watt tubes) + (1*40 Watt ballast) = 112 Watt total; to be determined <i>ex-post</i>
Description of measurement methods and procedures to be applied:	At the time of installation, the name plate wattage of replaced equipment (Brownfield) or of the most conservative common practice as avoided equipment installed (Greenfield) will be recorded.
QA/QC procedures to be applied:	A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data-entry errors.
Any comment:	-
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001. Please refer to Section 3.5.4 regarding the validation of the procedure for the determination of Greenfield baseline scenario.
Findings/Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate and fulfil compliance with requirements of para 2 AMS.II.C. consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/Conclusion CPA-001	The parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation. In compliance with applicability criterion No.12 of the applied methodology AMS.II-C a representative sample of baseline equipment replaced by LED equipment will be stored for physical inspection by the verifying DOE. It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is justified, conservative and reasonable.

Data / Parameter:	p_k
Data unit:	Watt
Description:	Power of the installed LED lighting equipment
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in section B.6.1 (CPA-001)	<i>ex-ante</i> estimate: LED luminaire (3*14 Watt LED) = 42 Watt total; to be determined <i>ex-post</i>
Description of measurement methods and procedures to be applied:	At the time of installation, the name plate wattage of each installed LED lighting equipment will be recorded.

QA/QC procedures to be applied:	A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data-entry errors.
Any comment:	-
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001.
Findings/Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology, in particular para 2 AMS.II.C. The procedures, templates and database defined in the CME Operational Manual [12] are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/Conclusion CPA-001	The parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation; It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is justified, conservative and reasonable.

Data / Parameter:	S_{metered,k}
Data unit:	Number
Description:	Total number of metered samples for each stratum installed within a SSC-CPA in order to monitor mean operating hours of the installed LED lighting equipment under stratum k.
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in Section B.6.1 (CPA-001)	For the stratum high-power indoor: 30 LED lighting equipment needs to be sampled.
Description of measurement methods and procedures to be applied:	Sample size is determined with a confidence precision ratio of 90/10. This is in line with the requirements listed in the EB 69 Annex 4 & 5.
QA/QC procedures to be applied:	The CPA owner has to hire an agent appointed by the CME for monitoring operating hours and execution of the non-metered sampling survey. This is to ensure there are proper QA/QC in place for the monitoring.
Means of validation:	SQS checked the sampling plan in the PoA-DD as well as additional information provided in Annex 4 to the PoA-DD. The number of metered samples for each stratum has been validated against the requirements of the latest standard for sampling and surveys for CDM project activities and PoAs (EB 69, Annex 4). A detailed description of the validation is found in Chapter 3.7.1 Sampling requirements. Further the DOE checked if the sample size determination for the first CPA is in accordance to the provisions made in the PoA-DD.
Findings/Conclusion PoA-DD	Details on the sampling plan are provided in PoA-DD as well as additional information in Annex 4 to the PoA-DD. The parameter and sampling method fulfil the requirements of EB 69 Annex 4 & 5 and para 13 (a) of AMS.II.C. Consistency of parameter between the PoA-DD and CPA-DDs is ensured. SQS confirms that the sampling approach has been correctly and appropriately chosen as Stratified Random Sampling and within the strata Simple Random Sampling is applied with the appropriately chosen 90/10 confidence/precision defined for reliability of sampling for small-scale project activities. This method allows for sample calculation for each strata independently; in case one or more of the strata remain empty, these strata are logically not used to select sample groups from.

	<p>PP has developed an sample size defining tool in excel [53] to be used for each CPA to define the applicable sample sizes for S_{metered} and $S_{\text{non-metered}}$ in line with the Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5) and latest Standard for sampling and surveys for CDM project activities and PoAs (EB 69, Annex 4). The excel sampling tool's content has been verified by SQS and found correct both for the sample size of the 1st CPA and for the use of future CPAs. The excel sampling tool is uploaded to the UNFCCC allowing the verification of its use in the future. It must be noted that the latest standard and guideline (EB 69 Annex 4 & 5) implies that in case the sample size is below 30 a minimum of 30 samples have to be used. This situation is most likely to occur for the project and the "take minimum 30 as the sample size" rule is correctly and precisely described in the PoA documentation as well as the excel tool created by the CME for this purpose</p>
Findings/Conclusion CPA-001	<p>Sample size determination is provided in Annex 4 to the specific CPA DD. SQS has checked the consistency between the provisions made in the PoA-DD and the sampling in CPA-001.</p> <p>It's SQS' opinion that the sample size and sampling method is adequate to achieve the required (90/10) confidence/precision requirements..</p> <p>SQS confirms that the S_{metered} size of 30 has been correctly calculated for the 1st CPA within which there is only one strata requires monitoring due to the unified nature of the lighting units (they all belong to the HI (high power indoor) stratum).</p>

Data / Parameter:	$S_{\text{non-metered},k}$
Data unit:	Number
Description:	Total number of non-metered samples for each stratum installed within a SSC-CPA in order to monitor the mean failure rate of the installed LED lighting equipment under stratum k.
Source of data to be used:	Database SSC-CPA 001
Value of data applied for the purpose of calculating expected emission reductions in section B.6.1 (CPA-001)	For the stratum high-power indoor: 30 LED lighting equipment needs to be sampled.
Description of measurement methods and procedures to be applied:	Sample size is determined with a confidence precision ratio of 90/10. This is in line with EB 69 Annex 4 & 5.
QA/QC procedures to be applied:	The CPA owner has to hire a by the CME approved monitoring entity for the operating hours and execution of the non-metered sampling survey. This to ensure there are proper QA/QC in places for the monitoring.
Means of validation:	SQS checked the sampling plan in the PoA-DD as well as additional information provided in Annex 4 to the PoA-DD. Further the DOE checked if the sample size determination for the first CPA is in accordance to the provisions made in the PoA-DD. The number of non-metered samples for each stratum has been validated against the requirements of the latest standard for sampling and surveys for CDM project activities and PoAs (EB 69, Annex 4). A detailed description is found below (Chapter 3.7.1 Sampling requirements).
Findings/ PoA-DD Conclusion	See details above under $S_{\text{metered},k}$ (the same sampling approach is applied) The parameter and the sampling method fulfil the requirement of para. 14 of AMS.II.C. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.

Findings/ CPA-001	Conclusion	It's SQS' opinion that the sample size and sampling method is adequate to achieve the minimum confidence/precision requirements. SQS confirms that the $S_{\text{non-metered}}$ size of 30 has been correctly calculated for the 1st CPA within which there is only one strata that requires monitoring due to the unified nature of the lighting units (they all belong to the HI (high power indoor) stratum).
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Data / Parameter:	O_k
Data unit:	Hours
Description:	Mean annual operating hours of LED lighting equipment installed.
Source of data to be used:	Metered sample group(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.6.1 (CPA-001)	<i>ex-ante</i> estimate: 24 hours/day; to be determined <i>ex-post</i>
Description of measurement methods and procedures to be applied:	Electronic metering equipment installed in monitoring sample group. This equipment will feed monitoring information/operating hours back to a centralised database.
QA/QC procedures to be applied:	All data entries will be checked on validity and correctness using dedicated software. A procedure has been developed to correct for non-valid data entries.
Any comment:	The number of meters to be installed per stratum k is defined under $S_{\text{metered},k}$
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001. SQS checked the calculation of ok_{net} provided in the specific CPA-DD as well as the plausibility of the assumptions for the continuous (24 hours per day) operations
Findings/Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/Conclusion CPA-001	The parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation. It is SQS' opinion that the value applied for the purpose of calculating expected emission reductions is justified, conservative and reasonable.

Data / Parameter:	$f_{\text{failure},y}$
Data unit:	%
Description:	Mean annual failure rate of the installed LED equipment.
Source of data to be used:	Periodic non-metered sampling survey(s).
Value of data applied for the purpose of calculating	<i>ex-ante</i> estimate: 1%; to be determined <i>ex-post</i>

expected emission reductions in section B.6.1 (CPA-001)	
Description of measurement methods and procedures to be applied:	Survey of non-metered sampling group for each stratum k. Executed at least every 6 months. Sub-populations to be monitored are stratified according to Lamp Classification. Data will be aggregated and stored in the central database.
QA/QC procedures to be applied:	The survey will consist of identifying LED lighting equipment, based on their "exact installation location" that are installed and operating. The exact installation location is the entry in the database that allows for a unique identification. While LED lighting equipment replaced as part of a regular maintenance or warranty program can be counted as operating, LED lighting equipment cannot be replaced as part of the survey process and counted as operating.
Any comment:	The number of LEDs to be included under the survey, per stratum k is defined under $S_{\text{non-metered},k}$
Means of validation:	SQS has checked the appropriateness of the relevant procedures in the CME Operational Manual to ensure the correctness of the monitoring. SQS checked the calculations of the first CPA-001. SQS checked the calculation of ok_{net} and $r_{\text{failure},y}$ provided in the specific CPA-DD as well as the plausibility of the assumptions.
Findings/Conclusion PoA-DD	It is SQS' opinion that description of parameter, unit, and source of data as well as the provided description of measurement methods and procedures to be applied are in accordance with the approved methodology. The procedures, templates and database defined in the CME Operational Manual are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/Conclusion CPA-001	The parameter is monitored during implementation (<i>ex-post</i>) and will be available after validation; it's SQS' opinion that the estimate provided in the specific CPA-DD for these data and parameters is reasonable. Based on own observations at the first end-user site and a plausibility check It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is justified, conservative and reasonable.

Based on the validation findings listed above SQS concludes:

Assumptions

It is the opinion of SQS, that all assumptions and data used by the project participants are listed in the PoA-DD, CPA-DDs including their references and sources.

References

SQS's validation opinion is that all documentation used by project participants as the basis for assumptions and source of data for the calculation of emission reductions are correctly quoted and interpreted in the PoA-DD and CPA-DDs.

Reasonableness

SQS's validation opinion is that all values used in the CPA-DD are justified and considered reasonable in the context of the proposed CDM PoA.

Methodology application

SQS's validation opinion is that the baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage, and emission reductions.

Reliability

All estimates of the baseline and project emissions can be replicated using the data and parameter values provided in CPA-DD-001.

3.10.2 Sampling Requirements

According to EB 69 Annex 4 the proposed sampling plan has been validated by SQS to determine whether it will provide parameter value estimates in an unbiased and reliable manner including determining:

- (a) Whether the proposed sample size and sampling method is adequate to achieve the minimum confidence/precision requirements. DOEs shall be able to reproduce the sample size calculation in order to validate the proposed sample size;
- (b) Whether the proposed sampling plan will ensure that samples are randomly selected and are representative of the population.

AMS-II.C requires to sample "power" (para. 12) and operating hours of equipment having a constant current (ampere) characteristics (para. 13(a); and annual checks of a sample of non-metered systems to ensure that they are still operating (para. 14). The approved SSC methodology does not further specify the requirements for sampling. In the design of the sampling plan the project participants used the Standard for sampling and surveys for CDM Project Activities and Programme of Activities (version 03.0 EB 69 Annex 4) and the Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5).

The sampling requirements have been validated by SQS as per Annex 4 to EB 69 (para. 7 to 27). The Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0 EB 69 Annex 5) has been used as supporting guidance.

Since the monitoring plan of the LED's kick-off PoA-DD and CPA-DDs was developed initially in 2010, it did not meet the EB 65 Annex and later the EB 69, Annex 4 standard for sampling and surveys for CDM project activities and PoAs CARs (CAR4, CAR 12) were raised. As a result of the CARs the following issues were corrected and/or clarified in the revised PoA DD and CPA DDs and the CME operational manual: Justification of the precision level; clear description of the monitoring of those parameters to be estimated by sampling; stratification ; source of equation used to determine sample size; Clear description of formula used, description and justification of parameters and estimates; sample size calculation with the given level of confidence/precision; procedures to ensure that samples are randomly drawn and are representative of the population; schedule for implementing the sampling plan; and identification of the skills and resources required for data collection and analyses.

According to para. 19 and 20 EB 69 Annex 4 parameter values will be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each individual CPA to be included in the PoA. Each CPA-DD will use sampling for the determination of the following parameter values for calculating emission reductions:

- $S_{\text{metered},k}$ Number of metered samples for each stratum installed within a SSC-CPA in order to monitor mean operating hours (o_k) of the installed LED lighting equipment under stratum k.
- $S_{\text{non-metered},k}$ Number of non-metered samples for each stratum installed within a SSC-CPA in order to monitor the mean failure rate ($r_{\text{failure},y}$) of the installed LED lighting equipment under stratum k.

In addition AMS-II.C para. 12 requires a representative sample of the "power" of replaced equipment (Brownfield) for physical inspection by the verifying DOE.

SQS confirms that no other parameters than those specifically indicated in CDM methodology are to be determined through sampling. The sampling plan provided in the PoA-DD, Annex 4 to the PoA-DD as well as additional guidance in the CME Operational Manual contain the required information regarding sampling design, data to be collected; and implementation plan:

Sampling design

The objective of the sampling effort, the timeframe, and the estimated parameter values are sufficiently de-

scribed in the parameters to be monitored. The sampling requirements are given by the applicable CDM methodology and the guidance provided by EB 69 Annex 4 & 5. The sample mean (or proportion) value will be used for the emissions reduction calculation.

Confidence/precision

Since there is no specific guidance in the applied methodology AMS.II-C, project proponents use 90/10 confidence/precision as the criteria for reliability of sampling efforts. This is in accordance with para. 10 EB 69 Annex 4. Precision is correctly interpreted as a relative unit when the parameter of interest is a proportion (or a percentage), and as a relative term when the parameter of interest is a mean.

Target Population

Under the PoA LED lighting equipment is broadly divided into two categories: indoor and outdoor. Further these can be divided - as per the power mentioned on the nameplate data of the LED lighting equipment - into high-power and low-power.

Sampling Method

The selected sampling method is stratified random sampling. It is justified by varying sub-populations. Therefore elements are grouped into relatively homogeneous sub-populations (strata) and each stratum is sampled independently. In line with EB 69 Annex 5 guidelines the sub-populations are collectively exhaustive and mutually exclusive, i.e. no population element is excluded but every element in the population is assigned to only one sub-population. It is SQS opinion that stratified random sampling is most applicable since there are obvious groupings of population elements whose characteristics are more similar within groups than across groups (indoor vs. outdoor/ high-power vs. low-power).

Sampling Frame

The following table shows the stratification for the selected random stratified sampling as provided in the PoA-DD (Table 6):

Indoor		Outdoor	
Low-power	High-power	Low-power	High-power
<40 Watt	≥ 40 Watt	<20 Watt	≥ 20 Watt
IL (Indoor Low)	IH (Indoor High)	OL (Outdoor Low)	OH (Outdoor High)

Hence, all LED lighting equipment under the CPAs that are included PoA will fall into one of the four strata: IL, IH, OL, OH identified above. These strata are to be applied for the metered and non-metered sample groups. The different strata as described above represent the target populations for sampling under the programme. The number and nature of strata is defined individually per CPA since both are ultimately defined by the content and participants of each individual CPA.

The Procedure for monitoring of the CPAs; under the heading 'random sampling' is described in the CME Operational Manual. In order to achieve the objectives of the procedures and avoidance of any bias and a minimization of non-sampling errors, the CME will contract one (or more) specialised and experienced monitoring actor(s) who will observe sound practices in designing samples, record sampling frames and administering surveys and measurements. Based on the submitted documents the validation team concluded that the samples will be drawn in a manner that avoids bias and that the data collection minimizes non-sampling (non-random, systematic) errors.

Sample size determination

To determine the amount of metering points per CPA, the sample size for each stratum under a CPA is to be determined based on the following formula provided by EB 69 Annex 5 (18):

$$n \geq \frac{1.645^2 \times NV}{(N-1) \times 0.1^2 + 1.645^2 V}$$

Where:

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

n	Sample size
N	Total number of LEDs installed within a stratum, if unknown use 20 000*
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision
SD	Is the overall Standard Deviation
mean	Is the overall mean

Estimates of the parameter of interest (proportion, mean and standard deviation) are required for sample size calculations.

For each CPA the sample sizes need to be determined in line with the guidance as laid down in the PoA-DD and Annex 4 to the PoA-DD.

In Annex 4 to the specific CPA-DD additional information on sampling size determination is provided. A sample size calculation for CPA-001 has been submitted to DOE. Sample size (n) of estimated target number of 75 000 baseline lighting equipment units to be replaced by LED is determined as n=30/stratum. Based on the Excel sheet and the formulae provided in the PoA-DD, SQS was able to reproduce the sample size calculation. In accordance with EB 69 Annex 4, para 12 the outcome has been checked using statistical software [51].

SQS deems the sampling design, the sampling frame and the determination of sampling size as appropriate and in accordance with EB 69 Annex 4 & 5. The proposed sample size and sampling method is adequate to achieve the minimum confidence/precision requirements.

Data collection

Lamp operating hours will be determined by means of a metered sampling survey. The LED lighting equipment in the sampling group is equipped with run time meters that measure the exact number of operating hours. The data from these run time meters is digitalized a subcontracted entity for monitoring and sent to the CME. The sampling data is extrapolated for the respective sub-population that the sample group represents.

Lamp failure rate is determined by means of the same non-metered sampling survey on an annual basis. The sample group will be identified by the monitoring actor on the basis of random sampling. The operating hours are corrected by the percentage of LEDs replaced ($r_{failure,k,y}$) times the down time (per stratum) for each type of LED lighting equipment ($of_{k,y}$).

During installation of LED Lighting Equipment the CPA-owner has to store (keep safe) the number and power of a representative sample of the baseline lighting equipment for each site, to allow for a physical verification by DOE.

Quality Assurance/Quality Control

The programme has the following Quality Assurance/Quality Control procedures in place.

Operating hours (h) metered sample: All data entries will be checked on validity and correctness using dedicated software. A procedure has been developed to correct for non-valid data entries.

Lamp Failure Rate (%), survey on non-metered sample: The survey will consist of identifying LED lighting equipment, based on their 'exact installation location' that are installed and operating. The exact installation location is the entry in the database that allows for a unique identification. While LED lighting equipment replaced as part of a regular maintenance or warranty program can be counted as operating, LED lighting equipment cannot be replaced as part of the survey process and counted as operating.

Based on the data gathered in the central database, a written monitoring report per CPA will be provided by the CME to the verifying DOE to demonstrate compliance with the monitoring requirements corresponding to the preceding monitoring period. Apart from the aggregated data, the monitoring report includes the outcome of the following internal checks of procedures:

- The single basic-check; to ensure that replacement procedures are being followed, at least one spot check at a replacement location will be done;
- The number check; to ensure that the number of LED equipment installed corresponds with the number of old equipment collected and avoided equipment;
- The single visual-check; in order to establish that collection of old equipment has been undertaken correctly, one physical spot check will be conducted of the replaced equipment prior to their destruction;
- The double-check; to ensure that no leakage occurs, either a certificate of scrapping is presented and checked or an independent party will be present at scrapping and testify the old equipment is indeed scrapped;

Responsibilities

The CPA owner is responsible for the LED lighting equipment installation. The monitoring actor is responsible for the correct installation of the sample Meters, the execution of the sampling survey and the gathering and digitalization of the respective sampling data.

Implementation

The CME will select one (or more) specialised and experienced monitoring actor(s) who will provide the monitoring service to the CPA owners. In this way potential mistakes during the sampling process can be minimised. The monitoring actor, contracted by the individual CPA owners who purchase its services, will be responsible for all sampling activities (installation of meters, survey execution, reading and processing of sampling data). Dedicated meters that will be installed at the sample lamp base measure the exact operation time of the respective sample. The data is sent to the monitoring actor who processes the data by means of dedicated monitoring software to produce daily usage data. This digitalised sampling data is then sent to the CME who collects and stores the data over time (central database) and issues the overall monitoring report. Each CPA will be sampled individually to prevent statistical bias.

3.10.3 Monitoring arrangements

A central verification system will be implemented at PoA level to determine the amount of emission reductions achieved under the programme. The verification system consists of a central database that aggregates and stores all monitoring data collected throughout the programme. It is operated and supervised by the CME or an entity assigned by the CME. Monitoring itself is performed at CPA level. That means that a separate data set and a respective monitoring report will be compiled per CPA. The data sets of all CPAs will be aggregated and stored within the central database at PoA level. CERs issued are exclusively influenced by the nature of the specific CPA. Thus, monitoring at CPA level increases robustness of the dataset lowers the margin for errors and strengthens data reliability.

Four data streams can be distinguished with respect to the data collected during implementation and execution of the individual CPAs. These are:

1. Installation data including the details of lamp installation in particular the number and wattage of re-

placed (brownfield) or avoided (Greenfield) equipment and the number and wattage of newly installed LED lighting equipment.

2. Scrapping data including the record on replaced and subsequently scrapped old lamp equipment
3. Sampling data including the mean operating hours (metered samples) of the newly installed lamps and their failure rate (non-metered survey).
4. If the devices installed replace existing devices (brownfield locations), the number and "power" of a representative sample of the replaced devices shall be recorded in a way to allow for a physical verification by DOE.

As required by methodology AMS-II.C. the number of LED lighting equipment installed must correspond with the number of old equipment units collected and with the number of old equipment units scrapped plus the number of avoided lighting equipment units. In the event that there is a discrepancy between the total of replaced and avoided lamps and the number of newly installed LED lighting equipment, there are deemed to be leakage emissions. In this case, the lower of the two numbers is used to calculate the emission reduction for that CPA. The same applies to the total number of old equipment replaced (Brownfield) and the number of old equipment collected and scrapped. Again, in case of a discrepancy between the numbers, the lower of the two numbers is used to calculate the emission reduction calculations for that specific CPA. SQS deems the approach as appropriate and conservative.

Both installation data and scrapping data are point measurements that are recorded once during the installation of new LED lighting equipment and the scrapping of replaced equipment, respectively. Installation data is provided by the CPA owner who is responsible for the installation of LED equipment under his CPA. Scrapping data is provided by the actor responsible for handling the replaced lamps. Sampling data is a continuous measurement. Individual CPA owners purchase monitoring sampling services from a dedicated actor responsible for monitoring appointed by the CME. The monitoring actor is responsible for collecting the installation data from the CPA owner, the scrapping data from the scrapping actor and for sampling both operating hours and failure rate of the installed LED equipment. The monitoring actor subsequently sends the aggregated monitoring data (installation, scrapping and sampling data) to the CME who compiles a monitoring report per CPA, which is then stored in the central database.

During installation of LED lighting equipment, it is the responsibility of the CPA owner to store (keep safe) the number and power of a representative sample of the baseline lighting equipment for each site, to allow for a physical verification by DOE.

The central database shows the emission reductions realised by the entire PoA and the individual data sets attributed to each CPA. Verification of the data compiled will occur at the end of each monitoring period. The programme database will record the start and end dates of each monitoring period, and record the emission reductions attributable to each monitoring period per CPA.

Based on the assessment of the CME management system [12], the description of the roles and responsibilities, an assessment of the skills and experiences of the persons/ entities involved it is SQS' opinion that the arrangements are sufficient to ensure that the coordinating/managing entity will have control of all records and information related to the monitoring of individual CPAs and will be in a position to ensure each CPA is being monitored in accordance with the specific requirements of the programme

Based on the validated monitoring and sampling plan SQS confirms that

- the monitoring plan contains a clear description of all necessary parameters;
- the means of monitoring described in the plan complies with the requirements of the methodology;
- the proposed sampling plan contains a description of the sampling approach, important assumptions, and justification for the selection of the chosen approach and will ensure that samples are randomly selected and are representative of the population. It enables to obtain unbiased and reliable estimates of the mean value of parameters used in the calculations of greenhouse gas emission reductions.
- parameter values that will be estimated by sampling are in accordance with the requirements in the

applied methodology; they will be sampled separately and independently for each of the individual CPAs to be included in the PoA.

It is SQS' opinion that

- the monitoring arrangements described in the PoA-DD and the CME Operational Manual are feasible within the PoA and its individual CPA(s); and that
- the project participants and in particular the CME is able to implement the monitoring plan.

3.11 Sustainable development

The Letter of Approval of the DNA of South Africa confirms sustainable development [8]. The authenticity of the Letter of Approval of South Africa is assessed in Chapter 3.1 and deemed genuine.

3.12 Local stakeholder consultation

Local stakeholder consultation is done at PoA level. The choice for PoA level is justifiable by the nature of all potential installations of LEDs having similar features on the national level. As the distribution of the programme is throughout South Africa therefore the stakeholders are also based across the entirety of South Africa. Therefore the Local Stakeholder Consultation conducted at PoA level has appropriately captured all relevant stakeholders. SQS is on the opinion that the PoA level LSC has been appropriately selected and justified.

Local stakeholder consultation took place on 27 January, 2011 in Freedom Park, Pretoria, South Africa. Invitees were from a broad range of stakeholders. In total, 19 stakeholders were present.

During the stakeholder consultation Mr. Francois van Tonder, Managing Director of Lemnis Lighting Africa briefed the stakeholders about the objective, project description, environmental impacts and benefits, applicability of technology, global and local benefits, contribution towards sustainable development, and status of the project activity. During stakeholder consultation different questions were raised. These were properly answered. The representatives of the CME were able to give positive answers. The questions mostly concerned aspects such as how energy savings and emission reductions will be measured, use of revenues from carbon credits, subsidies for LED suppliers, technical aspects of LED and questions related to the project schedule. No comments or concerns were raised during the consultation with local stakeholders that necessitated changes to the project design.

All stakeholders have issued their approvals/consents/licenses for setting up the project and no substantial negative comments were received on the project.

The stakeholder groups that had been identified and that were invited, were South African Government representatives, financing institutions; Local government representatives; end-users of LED lighting equipment and Eskom representatives.

In SQS's opinion, these are the groups affected by the project, and the project participants selected the right groups for the local stakeholder consultation process

Documents of the stakeholder consultation [52] were submitted to and assessed by the DOE and deemed as authentic. It is SQS's opinion, that the local stakeholder consultation is adequate.

In addition to the Local Stakeholder Consultation organised by the PP, the South African DNA publishes the CDM PDDs & PoA-DDs requesting a LoA on its own website¹¹. The DNA of South Africa makes all submitted Project Design Documents (PDDs/PoA-DDs) available for public commenting for a period of 30 days prior to the LoA decision being made. This publication of the PoA-DD of the project led to a South African entity commenting on the project which resulted in SQS liaison with the DNA of South Africa prior to the eventual issuance of the Host Country LoA on 22 February 2012.

3.13 Global stakeholder consultation

In accordance with paragraph 40 of the Validation and Verification Manual (version 01.2), SQS published the PoA-DD version 2 dated 22/12/2010, specific and generic CPA-DDs version 2 dated 22/12/2010 on 24/12/2010 for global stakeholder consultation open for comments for 30 days.

The LED's kick-off programme of activity received no comments.

3.14 Environmental impacts

The proposed programme of activity involves the distribution and installation of LED lighting equipment. The host Party South Africa does not require an environmental impact assessment for this programme of activity.

With regard to the CPAs the South African Government does not require an environmental impact assessment. The PoA-DD states that the primary environmental impact of the PoA is the physical waste created by the replaced lighting equipment. A procedure to minimize such potential environmental impacts has been incorporated to the CME Operational Manual]. Procedure CME/01/12 delineates that any CPA operator is required to comply with government guidelines and legislation regarding the environmentally sound management of mercury from end-of-life mercury using lamps. Furthermore the waste of the collected and destroyed baseline lighting equipment shall be handled in an appropriate and environmental friendly way with due care and safety without causing any hazard. According to the operational manual the CME will ensure this process is followed by including the procedure in the relevant contracts between CME and CPA operator and between CPA operator and an entity subcontracted for scrapping purpose.

SQS's validation opinion is that the CME is aware of transboundary environmental impacts and has them sufficiently reflected in the PoA-DD and considered in the management system.

¹¹ South African DNA published PDDs for public commenting available at http://www.energy.gov.za/files/esources/kyoto/kyoto_public.html (last accessed on 10/08/2012)

3.16 Unique requirements to PoA

3.16.1 Operational and management arrangements for the PoA

Means of validation:

During the on-site visit and follow-up interviews with CME SQS assessed the management system by interviews and cross-checks.. Topics and people interviewed are listed in Appendix A to this validation report. A desk-review of the operational and management arrangements established by the coordinating/managing was performed.

The CME procedures could not initially ensure that the CME's management system fully complies with the standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA as the PoA was developed prior to the emergence of the PoA standard. In response to a CAR (CAR7) the CME Operational Manual has been amended and all documents required to validate inclusion of CPA-001 have been submitted to SQS. The CME management system consists of:

- A Clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies made available to SQS at the time of validation of the PoA;
- Records of arrangements for training and capacity development for personnel made available to SQS at the time of validation of the PoA;
- Procedures for technical review of inclusion of CPAs made available to SQS at the time of validation of the PoA;
- A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA);
- Records and documentation control process for each CPA under the PoA, made available to SQS at the time of request for inclusion of the CPA-001;
- Measures for continual improvements of the PoA management made available SQS at the time of validation of the PoA;

Roles and Responsibilities

The roles and responsibilities of personnel involved in the management of the PoA are sufficiently described in the PoA-DD and in more detail in the CME Operational Manual [12].

The CME has defined the following roles for the entities involved under the programme:

Roles under the programme	Responsibilities
Coordinating and Managing Entity	<ul style="list-style-type: none"> • Overall management and coordination of the PoA, communication with the EB • Approves inclusion of a CPA under the PoA based on the Eligibility Criteria • Operates and supervises central monitoring database • Checks aggregated CPA monitoring datasets to prevent double counting • Compiles monitoring reports per CPA and sends these to DOE for verification • Selects and proposes eligible actors to fulfil the monitoring and scrapping roles under the PoA
CPA Owner	<ul style="list-style-type: none"> • Enter into sales agreements for LED lighting equipment with end-users • Install or supervise instalment of LED lighting equipment (CPA owner has final responsibility for installation) • Deliver installation data to the actor fulfilling the monitoring actor • Ensure eligibility criteria are fulfilled • Must enter into a contract with monitoring and scrapping actors appointed by the CME to monitor according to the PoA monitoring plan
End User (s)	<ul style="list-style-type: none"> • Purchase or receive LED lighting equipment from the CPA Owner • Waive all their rights to CERs generated under the CPA to the respective CPA owner

Roles under the programme	Responsibilities
	<ul style="list-style-type: none"> • Use the LED lighting equipment with due care
CER buyer	<ul style="list-style-type: none"> • Purchase CERs from CPA Owner • Payment of PoA management expenses to CME
Monitoring Role	<ul style="list-style-type: none"> • Implement metered sampling to measure the mean operation time of installed LED lighting equipment • Implement non-metered sampling survey to determine the mean failure rate of installed LED lighting equipment • Collect all monitoring data: sampling data, installation data and scrapping data. Deliver the aggregated monitoring data to the CME
Scrapping Role	<ul style="list-style-type: none"> • Scrapping of replaced lighting equipment according to CDM rules • Deliver scrapping data to monitoring actor fulfilling this role
Financing Role	<ul style="list-style-type: none"> • If applicable provide financial support to the CPA Owner to implement the CPA.

CME job profiles for existing and new posts to deal with the up-scaling as well as short CVs of existing personnel made available to SQS. A competence assessment of the CVs revealed that the people involved in the PoA have sufficient expert and practical knowledge in data management, data transfer, QA/QS and CDM monitoring. It is SQS opinion that the combined experience of the CME plus the entity to be contracted for monitoring are sufficient.

Arrangements for training and capacity development are defined in the CME Operational Manual (CME/01/22). Continuous improvement as a concept is incorporated into the CME Operational Manual (CME/01/23) based on the corresponding ISO concept. Improvements will be measured by the appropriate ISO standards. Lemnis Lighting B.V./ Lemnis Lighting Africa (the CME) has its own dedicated office in Johannesburg and its managing director is in charge of the management system. Standardized training and supervision will be done by the CME and the entity to be contracted for the monitoring and scrapping activities. During the on-site visit the audit team interviewed a representative of the then candidate monitoring entity. It is SQS opinion that the monitoring entity to be contracted by the CME has the required professional skills and experience to perform monitoring and sampling according to the approved methodology and EB 69 Annex 4.

Based on the assessment of the CME management system and the description of the roles and responsibilities it is SQS' opinion that the arrangements are sufficient to ensure that the coordinating/managing entity will have control of all records and information related to the implementation of individual CPAs and will be in a position to ensure each CPA is being operated in accordance with the specific requirements of the programme. It is SQS opinion that the arrangements and procedures are sufficient to meet EB 63 Annex 3, para. 9 (a), (b) and (f).

CPA Record Keeping

Each CPA owner is responsible for monitoring the CPA according to the requirements stipulated in methodology AMS.II-C. and the 'LED's kick-off' monitoring plan described in section A.4.4.2 of the SSC-PoA-DD. The monitoring services are to be obtained from a CME approved party. Each CPA will have a unique CPA identification number in the database that is mutually exclusive with the other CPAs. Monitoring is performed at CPA level so that every CPA has its unique and individual set of data in the central database. SQS reviewed the CME database operational manual procedures [12]. It is SQS opinion that the arrangements and procedures are sufficient to meet EB63 Annex 3, para. 9 (e).

Regarding the unique distinction of future CPAs the procedure CME 06 for issuing of unique ID for CPA's and updating of CPA list guarantees the sustain of unique identification.. Procedures for technical review of inclusion of further CPAs under the PoA are sufficiently defined in the CME Operational Manual . The CME has also prepared all forms and templates required by these procedures. It is SQS opinion that the arrangements and pro-

cedures are sufficient to meet EB63 Annex 3, para. 9 (c). Validation of the first CPA and its inclusion under the PoA is discussed in Chapter 3.12.3.

Procedures to Avoid Double Counting

Each exchange of baseline lighting equipment with LEDs will be recorded. When LED lighting equipment is installed under the CPA, this will be recorded in the CPA data set by the parameter 'exact installation location'. This parameter is a unique address and/or description of the location where LED lighting equipment is installed. All CPA data sets will be aggregated at PoA level in a central database. At verification, the CME will review the CPA data sets and check whether the parameter 'exact installation location' is unique. This procedure ensures that no double counting occurs within the overall PoA. In case of multiple entries of exact location, a detailed check will be made of that entry, including determination of precise lamp type installed. In case of double entries, the latest entry will be removed from the database. The PoA platform design allows for multiple CPA owners. Each CPA owner will enter into a contractual agreement with the CME in order to subscribe their activity to the 'LED's kick-off' PoA. All corresponding procedures are defined in the operational manual and have been assessed by SQS.

A procedure 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 is included in the CME Operational Manual (CME/01/16). Double counting is also considered by PoA eligibility criteria No. 2 and No.7. It is SQS' opinion that the procedures related to the preparation of new CPAs and in particular the procedure to avoid double counting of a CPA (CME/01/16) are sufficient to meet EB 63 Annex 3, para. 9 (d).

In summary SQS concludes that the CME has developed a well documented management system in accordance with the requirements of EB 65 Annex 3, para. 9 (a-f).

3.16.2 Eligibility criteria for CPAs

The CME specified the following eligibility criteria in the PoA-DD in order to determine whether or not these criteria are sufficient to ensure that all CPAs would comply with the CDM requirements applicable to the PoA:

Eligibility Criteria	Assessment/ Conclusion	SQS
No.1: Does the CPA regard solely distribution within the programme's geographic boundary as defined in the SSC-PoA-DD?	Eligibility criterion N°1 ensures that the boundary of a CAP is consistent with the programme's geographic boundary.	
No. 2: Shall the end user locations be uniquely identifiable by address and/or unique location description to avoid double counting of emission reductions?	Eligibility criterion N° 2 ensures the applicability of a CPA according to para. 4 AMS-II.C. Further a procedure to avoid double counting within the PoA frame has been defined in the CME Operational Manual . Double counting is also addressed by criterion N°7 (see below)	
No. 3: Do the end users of the LED lighting equipment waive all their rights to CERs generated under the CPA to the respective CPA owner(s)?	A template "CER-waiver" has been prepared by the CME. A signed waiver by the end-users is a prerequisite to include a CPA to the PoA.	
No. 4: Does the CPA regard the installation of LED lighting equipment? Which may or may not include an LED luminaire (including lamp and corresponding power conversion electronics, thermal management, fixture etc.)?	This criterion ensures that no other technology/ measure will be applied by any CPA operator than those specified in the PoA.	

No. 5: Will the CPA owner ensure that for each installed LED lighting equipment the rated capacity or output or level of service (e.g., lumen output) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline?	Level of service criteria guarantees the applicability of AMS-II.C para. 2.
No. 6: Has the CPA provided a forecast concerning the CPA start date supported through documentary evidence?	CPA operator has to submit the first order of LED equipment to the CME as evidence of the starting date of a CPA. This will ensure that the starting date of any CPA will not be prior to the start of the validation of the PoA.
No. 7: Has the CPA owner confirmed that the CPA under the PoA is a voluntary action and is neither registered as an individual CDM project activity nor included in another registered CDM PoA?	The procedures and conditions for CPA inclusion as defined in the CME Operational Manual] will ensure that those operating a CPA are aware of and have agreed that their activity is being subscribed to the PoA (refer also to criterion No. 3). The record keeping system for each CPA under the PoA will identify each end-user site under a serial numbering system to uniquely identify each location (criterion No. 2). The system to avoid double counting has been described in the PoA-DD and the concerned CME Operational Manual which has been validated by the audit team to be sufficient. For this the CME will screen every new CPA to ensure that no double-counting occurs. Also, as each CPA will have a unique title in host country, it can be checked whether a CPA under the PoA already is a registered CDM project or CPA in another PoA from the UNFCCC website. The de-bundling check will be performed for every CPA in accordance with EB 54, Annex 13.
No. 8: Does the CPA comply with the applicability criteria of methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" (version 13) used in the PoA?	A CPA operator has to declare that the CPA complies with the applicability criteria of methodology AMS-II.C. The CME will check the CPA-DD against these criteria as defined in the procedure to check CPAs eligibility in the CME Operational Manual .
No. 9: Will the CPA meet the requirements pertaining to the demonstration of additionality as specified in EB 63, Annex 24, Attachment A of Appendix B of the Simplified modalities and procedures for small-scale CDM project activities (Version 08)?	Additionality is demonstrated at PoA level. The barriers have been checked and found real. Individual CPA additionality is addressed by eligibility criteria 7 and 8.. Regarding CPA additionality, as defined in Annex 1 of the Template Eligibility Check Report procedure CME/01/16, a compliance statement is required from prospective CPA-owners.". This requires that any CPA operators have to declare how the CPA will support end-users to overcome the barriers as per the assessment of additionality in PoA-DD.
No. 10: Does the CPA rule out including facilities that are covered by an enforced government policy that includes mandatory adoption of LED lighting equipment?	For this eligibility criterion the compliance statement from prospective CPA-owners is required that includes the requirement of a signed statement (based on the template provided in CME procedure CME/01/25) by the end-users under each respective CPA confirming that the end-user sites where LED lighting equipment are to be installed, as part of LED's kick-off, are not covered by an enforced government policy that includes mandatory adoption of LED lighting equipment. At time of validation no such official policy is enforced in the host country.
No. 11: Is the market penetration of LED lighting in South Africa below 33%	The eligibility criteria ensures that no CPA will be included to the PoA if LED market penetration is above 33%.

at the time of inclusion of the CPA?	
No. 12: Has the owner of the CPA provided an affirmation that funding from Annex I parties, if any, do not result in a diversion of official development assistance?	CPA operator has to submit an affirmation that funding from Annex I parties, if any, do not result in a diversion of official development assistance.
No. 13: Does the CPA involve the installation of LED lighting equipment for grid-connected use in publicly, commercially, industrially or otherwise employed locations?	The criterion ensures that only grid connected installation of LED lighting equipment in publicly, commercially, industrially or otherwise employed areas are to be included to a CPA and the CME can re-test the validity of assumptions made in the PoA-DD.
No. 14: Does the CPA comply with the sampling requirements as per the sampling plan of the PoA, in accordance with the 'Standard for sampling and surveys for CDM project activities and programme of activities' EB 69, Annex 4 Version (03.0) and Annex 5 Version (02.0)?	The CME will check whether the monitoring plan of a CPA is in accordance with the requirements as per the sampling plan of the PoA.
No. 15: Will the energy savings be capped at 60 GWh/per year?	This criterion ensures that emission reductions of every CPA in aggregate meet the SSC threshold criteria and remains within this threshold throughout the crediting period of the CPA.
No. 16 Is the SSC-CPA approved by Lemnis Lighting B.V. and the DOE prior to its incorporation into the PoA?	This criterion ensures that no CPA will be included to the PoA without prior approval by the CME and a DOE.
No. 17: Does the SSC-CPA satisfy debundling rules for PoA through the fact that each installation accounts for less than 1% of the total energy savings of the SSC-CPA?	The procedure to ensure compliance with debundling rules are elaborated on in Chapter A.4.4.1. of the PoA-DD and has to be demonstrated as eligibility criterion.

The managing entity employs clear and unambiguous criteria for the inclusion of the CPAs. The list of the eligibility criteria meet the requirements of EB 65 Annex 3 para. 14 and include eligibility criteria derived from the relevant requirements of attachment A of Appendix B (EB 63 Annex 24) of the "Simplified modalities and procedures for small-scale CDM project activities". The CME Operational Manual defines all procedures, forms and templates to assess and report these criteria. Therefore it is SQS validation opinion that the eligibility criteria as stated in the PoA-DD and demonstrated in the generic CPA-DD are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs under the PoA.

3.16.3 Validation of the specific CPA (CPA-001)

According VVM. 1.2 para 168 SQS has assessed the specific CDM SSC CPA-DD (CPA-001], which the project participants submitted together with the CDM-SSC- PoA-DD for validation, to determine whether or not it complies with the eligibility criteria specified in the PoA-DD. The means of validation to determine compliance with this requirement are listed below:

Validation method

The accuracy and completeness of the CPA-001 description was validated by:

- A desk review of the specific CDM-CPA-DD submitted by the client and additional supporting documents (a list of all documents reviewed during validation is provided in Appendix C).

- On-site visit meetings with CME, monitoring, scrapping, design and financial experts on 19-22 October 2010 (programme of the on site visit and list of interviewees are provided in Appendix A).
- A desk review to check eligibility of the proposed first CPA to determine compliance with the eligibility criteria specified in the PoA-DD.
- Follow-up telephone interviews with project participants.

The information provided by the PPs is deemed sufficient to assess the eligibility of CPA-001 with the PoA.

The following table provides the assessment and conclusions of the DOE to determine compliance of CPA-001 with the eligibility criteria defined in the PoA:

No	Eligibility Criteria	Answer CPA-DD	Evidence submitted by the owner of CPA-001/ CME	Assessment/ Conclusion SQS
1	Does the CPA regard solely distribution within the programme's geographic boundary as defined in the SSC-PoA-DD?	YES	CPA owner and CME documentation and correspondence listing the planned/eligible sites [16-19]	OK. The sites as listed in the supporting documents demonstrate that the end-user sites are within the boundary of the PoA.
2	Shall the end user locations be uniquely identifiable by address and/or unique location description to avoid double counting of emission reductions? (new)	YES	CME Operational manual procedure CME/01/06: CPA owner and CME documentation and correspondence listing the planned/eligible sites [16-19]	OK. The information provided and the CPA record keeping system reviewed allows for the unique identification of the end-user sites and avoid double counting within the CPA/ PoA.
3	Do the end users of the LED lighting equipment waive all their rights to CERs generated under the CPA to the respective CPA owner(s)?	YES (see FAR 1)	CPA owner and CME documentation and correspondence [16-19] CER-waiver to be signed by CPA-001 owner	The CME operational procedures include a template for the waiver of CERs (CME/01/17). The CER waiver from the first foreseen end-user under of CPA-001 will be signed at a later stage therefore a FAR(FAR 1) is raised). Thus, information provided is sufficient to determine that CPA-001 will be in compliance with the eligibility criterion.

4	Does the CPA regard the installation of LED lighting equipment? which may or may not include an LED luminary (including lamp and corresponding power conversion electronics, thermal management, fixture etc.)?	YES	CPA owner and CME documentation and correspondence [16-19] project description in the specific CPA-DD	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
5	Will the CPA owner ensure that for each installed LED lighting equipment the rated capacity or output or level of service (e.g., lumen output) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) than the baseline?	YES	CPA owner and CME documentation and correspondence [16-19]	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
6	Has the CPA provided a forecast concerning the CPA start date supported through documentary evidence?	YES	CPA owner and CME documentation and correspondence [16-19]	OK, The LED luminaries are being tested and planned to be ordered at the time of or after the CPA start date selected (2/09/2012)
7	Has the CPA Owner confirmed that the CPA under the PoA is a voluntary action and is neither registered as an individual CDM project activity nor included in another registered CDM PoA?	YES	CPA owner and CME documentation and correspondence [16-19] and SQS has consulted the database of the South African DNA ¹² including PIN (Project Idea Note) and PDDs submitted for approval and those projects that have received their LoAs.	OK. The owner of the CPA-001 has numerous CDM projects in various stages of development but not for the technology applied in the LED PoA; the two other LED projects are at an early, PIN stage and do not overlap with CPA-001's geographical boundaries The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.

¹² The website of the DNA of The Republic of South Africa:

http://www.energy.gov.za/files/esources/kyoto/2012/CDM_Projects_Portfolio_19_June%202012.pdf (last accessed on 15/08/2012)

8	Does the CPA comply with the applicability criteria of methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" (version 13) used in the PoA?	YES	CDM-SSC-CPA-DD for CPA-001 and supporting documentation (see Section 3.9)	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion
9	Will the CPA meet the requirements pertaining to the demonstration of additionality as specified in EB 63, Annex 24, <i>Attachment A of Appendix B of the Simplified modalities and procedures for small-scale CDM project activities (Version 08)</i> ?	YES	CDM-SSC-CPA-DD for CPA-001 and supporting documentation (see Section 3.9).	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
10	Does the CPA rule out including facilities that are covered by an enforced government policy that includes mandatory adoption of LED lighting equipment?	YES (see FAR 1)	CPA owner and CME documentation and correspondence [16-19] End-user Declaration as defined by CME/01/25 on no Government policy LED lighting to be signed by CPA-001 owner.	OK. The CME operational procedures include a template for the declaration on no Government policy LED lighting (CME/01/25). The declaration will be signed at a later stage therefore a FAR(FAR 1) is raised) .Thus, information provided is sufficient to determine that CPA-001 will be in compliance with the eligibility criterion.
11	No. 11: Is the market penetration of LED lighting in South Africa below 33% at the time of inclusion of the CPA?	YES	Department of Energy and Department of Trade & Industry has quantified the South African lighting market in 2009 based on ESKOM data	OK, Current market penetration of LED lighting equipment is close to 0% (it is so small that it cannot be measured) this has been confirmed by independent market expert [25]
12	Has the owner of the CPA provided an affirmation that funding from Annex I parties, if any, do not result in a diversion of official development assistance?	YES (see FAR 1)	CPA owner and CME documentation and correspondence [16-19] Declaration regarding the lack of Annex I funding to be signed by CPA-001 owner	OK. The declaration will be signed at a later stage therefore a FAR(FAR 1) is raised) .Thus, information provided is sufficient to determine that CPA-001 will be in compliance with the eligibility criterion..

13	Does the CPA involve the installation of LED lighting equipment for grid-connected use in publicly, commercially, industrially or otherwise employed locations?	YES	CPA owner and CME documentation and correspondence [16-19]	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
14	Does the CPA comply with the sampling requirements as per the sampling plan of the PoA, in accordance with the 'Standard for sampling and surveys for CDM project activities and programme of activities' (EB 69, Annex 4 Version (03.0) and Annex 5 Version (02.0))?	YES	CDM-SSC-CPA-DD for CPA-001 and supporting documentation (see Section 3.10); CME operation manual, procedure CME/01/08	CPA-001 complies with the sampling requirements as per the sampling plan of the PoA, in accordance with EB 69, Annex 4 Version (03.0) and Annex 5 Version (02.0).
15	Will the energy savings be capped at 60 GWh/per year?	YES	CDM-SSC-CPA-DD for CPA-001 and supporting documentation CER calculation excel sheet [16-19]	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
16	Is the SSC-CPA approved by Lemnis Lighting and the DOE prior to its incorporation into the PoA?	YES (see FAR 1)	CPA owner and CME documentation and correspondence [16-19]	OK, CPA-001 has been proposed by CME to CPA-001 owner. DOE's validation opinion regarding CPA-001 is part of this validation report.
17	Does the SSC-CPA satisfy de-bundling rules for PoA through the fact that each installation accounts for less than 1% of the total energy savings of the SSC-CPA?	YES	CDM-SSC-CPA-DD for CPA-001 and supporting documentation	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.

Based on the assessment above it is SQS opinion that CPA-001 is compliant with the eligibility criteria defined in the PoA. Other validation findings and conclusions related to CPA-001 project description, baseline and monitoring are found in the relevant section of this report.

3.17 Validation protocol

In order to ensure transparency and organize the corrective or additional information and measures a vali-

validation protocol was established for the project (see Appendix F). The protocol shows in transparent manner the criteria (requirements), the means of validation and the results from validating the identified criteria including any resulting CAR, FAR and CL.

4 List of Interviewees and Documents Reviewed

The on-site audit and interviews were done according to the on-site visit programme (see Appendix A) which was communicated to the project owner in advance of the audit.

The following stakeholders were interviewed during the validation (see Appendix B).

The following documents were assessed during the validation (see Appendix C).

5 Validation Team and Reviewer

The following matrix shows the names and roles of the members of the validation team and the technical reviewer. The reviewer is not a member of the validation team. Certificates of Competence for each validation team member and of the reviewer are included in Appendix D to this report.

Name	Role (1)	Country	Duties					
			Desk review	On-site audit	Resolution of CAR & CL	Report	Statistical expertise	Technical review
Zsolt Lengyel	LA	Switzerland	X	X	X	X	X	
Oliver Stankiewicz	TM	Switzerland		X				
Margit Haberleiter, PhD	TM	Switzerland	X				X	
Martin Enderlin, PhD	TR	Switzerland						X

(1) LA = Lead auditor/assessor; TM = Team member; TE = Technical expert (if any); TR = Technical reviewer

6 Quality Control

Cross-checks and/or other plausibility checks undertaken during validation are mentioned in the report or in the protocol. The draft validation report, including the initial validation findings, is checked by an internal reviewer (a member of the validation team) before being submitted to the project participants. The final validation report undergoes a technical review before requesting registration of the project activity. The technical reviewer (not a member of the validation team) is qualified in accordance with SQS' qualification scheme for CDM validation and verification.

7 Appendix A-B: On-Site Visit Programme and Interviewees

Date 19-22/10/2010

Time		Topic	Function/Department	People interviewed
from	to			
19/10/2010				
9.00	12.00	PoA analysis, design features of LED lights and luminaries, Document check CME capacity	<ul style="list-style-type: none"> VP Business Development & Strategy/ Managing Director - Lemnis Lighting Africa (CME) Partner, Do/Inc (PP, PoA document author) 	<ul style="list-style-type: none"> Francois van Tonder Kim van der Leeuw (present at all meetings listed below)
13.00	14.30	Monitoring aspects of CPA/PoA	<ul style="list-style-type: none"> Professor, Tshwane University of Technology (measurement and monitoring expert) 	<ul style="list-style-type: none"> Prof O.D Dintchev
17.00	18.30	Waste and scrapping aspects	<ul style="list-style-type: none"> Manager, Actebis (waste management company) 	<ul style="list-style-type: none"> Ben Hol
20/10/2010				
10.00	12.30	Financing of energy efficiency; barriers for LED finance, alternative funding instruments in SA	<ul style="list-style-type: none"> Partner, Deloitte, & Econavitas 	<ul style="list-style-type: none"> James Hilburn
14.00	17.00	Eligibility criteria review	<ul style="list-style-type: none"> VP Business Development & Strategy/ Managing Director - Lemnis Lighting Africa (CME) Partner, Do/Inc (PP, PoA document author) 	<ul style="list-style-type: none"> Francois van Tonder Kim van der Leeuw
21/10/2010				
9.00	12.00	Market data for lighting/LEDs; independent monitoring, installer training, survey of CPAs	<ul style="list-style-type: none"> Manager, Global Carbon Exchange 	<ul style="list-style-type: none"> Kevin James
22/10/2010				
9.00	12.00	Identification and discussion of key findings	<ul style="list-style-type: none"> VP Business Development & Strategy/ Managing Director - Lemnis Lighting Africa (CME) Partner, Do/Inc (PP, PoA document author) 	<ul style="list-style-type: none"> Francois van Tonder Kim van der Leeuw

8 Appendix C: Documents Reviewed

[Ref. Nr.]	Document Title
1	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off 1 dated 10/07/2010
2	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 2 dated 22/12/2010
3	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 3 dated 18/05/2011
4	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 54dated 04/05/2012
5	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 5 dated 05/07/2012
6	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 6 dated 20/08/2012
7	PoA-DD, CPA-DD (generic, CPA-001) LED's kick-off Version 7 dated 07/11/2012
8	CPA-001 ER calculations LEDs kick off-CER calculations_ 2012_v03.xls
9	LoA of The Republic of South Africa for LED's kick-off PoA without reference dated 22/02/2012
10	Annex I LoAs merged into one single file containing: LoA of The Netherlands for the LED's kick-off PoA with reference 2011ANL431 dated 08/03/2011 for Mabanaf B.V LoA of The Netherlands for the LED's kick-off PoA with reference 2011ANL446 dated 11/03/2011 for Do-Inc business B.V. LoA of The Netherlands for the LED's kick-off PoA with reference 2011ANL448 dated 11/04/2011 for Lemnis Lighting B.V.
11	MOC Form "MoC_LEDsKickOff_signed by MABANAFT_Lemnis_CLD_KvdL.pdf"
12	South African Grid factor calculation "EF sheet LEDs kick off _revised_2012.xls" and the screen prints of Eskom's data for calculating the EF "Eskom - CDM Calculations.pdf" (ESKOM data for grid factor calculation (available at: http://www.eskom.co.za/live/click.php?u=%2Fcontent%2FCEF_CalculatorFINAL2010-2011%7E1.xls&o=Item%2B236&v=454b33)
13	CME Operational Manual CONFIDENTIAL VERSION 120820_LEDs_Kickoff_CME_Operational_Manual_v_2.pdf
14	CME Operational Manual NON-CONFIDENTIAL VERSION 120820_LEDs_Kickoff_CME_Operational_Manual_v_2_non-confidential version.pdf
15	Department of Energy's Strategic Plan for the 2010-2013 period "doestratplan2010.pdf"
16	Access to finance barrier documentation "Statement Deloitte on financing 2011 01 04.pdf"
17	Project Proposal by CME for CPA-001 owner "111115_Project Proposal CPA-001.pdf"
18	Project quotation by CME for CPA-001 owner "120308_CPA-001 Quote.pdf"
19	CPA-001 Quote Accompanying letter.pdf
20	Compilation of emails between CME and CPA-001 owner "120518_Overview_email_correspondence_Lemnis_and_CPA-001.pdf"
21	Testing results at CPA-001 site "Old equipment Nordland testing result at CPA-001 site.pdf"
22	" Manufacturer's data sheet for existing equipment for CPA-001 site Old equipment Nordland N50 Data Sheet.pdf"
23	Testing result for Lemnis lighting equipment " Lemnis equipment testing result.pdf"
24	Scrapping offer for used lamps/replaced lamps "Cover Letter Scraper ACTEBIS.pdf"
25	Scrapping offer for used lamps/replaced lamps - pricing "Quotation - ACTEBIS.pdf"
26	Independent expert stamen on market penetration of LED lamps "Market penetration analysis of LED by GCE.pdf"
27	South African lighting requirements for workplaces "Regulation - 2281 - Environmental regulation for workplaces.doc"

27	Governmental EE and demand side policy "Energy_Efficiency_and_Demand_Side_Management_Policy.pdf"
28	Governmental EE and demand side policy origins (2004) "EE Strategy of South Africa sem_sup2_south_africa 2004.pdf"
29	Tariffs for various users groups by Eskom "ESKOM Tariff book.pdf"
30	Overview of South African ESCOs "ESCO KfW PWC IDCESCO 2012 May presentation.pdf"
31	Eskom's Standard Offer (subsidised tariffs for energy efficient equipment) "31 SOP_Toolkit_01 Jun_2012.xls"
32	Demonstration of payback periods "Payback Period Calculations 2.xls"
33	National Electricity Regulator of South Africa (NERSA)s annual report "2007 Nersa ESS Booklet_o.pdf"
34	University of Pittsburgh (2010): LED streetlights best buy for cities, researchers report. ScienceDaily. Retrieved March 7, 2012,
35	Lighting Retrofit and Relighting: A Guide to Energy Efficient Lighting, John Wiley and Sons. Inc, New Jersey, 2011
36	LED Street Lighting, Host Site: City of San Francisco, California. Final Report prepared in support of the U.S. DOE Solid-State Lighting Technology Demonstration Gateway Program and PG&E Emerging Technologies Program
37	Potential Environmental Impacts of Light Emitting Diodes (LEDs): Metallic Resources, Toxicity, and Hazardous Waste Classification, Environmental science and technology, Volume: 45, Issue: 1 (January 1, 2011), pp: p320, 8p.
38	Rogers, E.M. (1995): Diffusion of Innovations. 3rd Edition. Rev. Edition of: Communication of innovations. The Free Press, New York
39	Strategies Unlimited report, 2nd edition, February 2011: LED Luminaries, Market Analysis and Forecast. Chapter 8 "Outdoor Area Lighting", in particular Section 8.3.7 entitled "Challenges".
40	Wunderlich, F. et al.: LEDs Magazine Nov. Dec. 2010: LED lighting at the crossroad: country road or express way
41	Jackson, J. (2010): Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 p. 3865-3873
42	REEEP Energy Efficiency Coalition
43	Taylor et al. (2008): Financing energy efficiency; lessons from Brazil, China, India and beyond, World Bank
44	K. Heer (2011): The challenge of up-scaling efficient lighting in the developing world, University of Utrecht
45	Okay, N. and Akman, U. (2010): Analysis of ESCO activities using country indicators, in: Renewable and Sustainable Energy Reviews, Volume 14, p.2760-2771
46	Painuly, J.P. et al. (2003): Promoting energy efficiency financing and ESCOs in developing countries: mechanisms and barriers, in: Journal of Cleaner Production, Volume 11, p.659-665
47	Ansar, J. and Sparks, R. (2009): The experience curve, option value, and the energy paradox, in: Energy Policy Volume 37, p.1012-1020.
48	Email from Designated National Authority for Clean Development Mechanism Department of Energy (Republic of South Africa) explaining the LoA conditions dated 09/07/2012
49	Statement by CME that the project does not receive any Annex I country public funding
50	ESKOM Annual Report 2010/2011
51	Statistical software: www.raosoft.com/samplesize.html
52	Full documentation of the Stakeholder consultation (invitation, attendance sheet, presentations etc)
53	Sample size defining tool in excel for 1 st CPA and future CPAs to define sample size for S _{metered} and S _{non-metered}

9 Appendix D: Certificates of Competence

Name: Mr Zsolt Lengyel

Scopes of expertise:		
1	Energy industries (renewable/non-renewable sources) TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar TA 1.2: Energy generation from renewable energy sources	 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2	Energy distribution TA 2.1: Electricity distribution TA 2.2: Heat distribution	 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
3	Energy demand TA 3.1 Energy demand	 <input checked="" type="checkbox"/>
4	Manufacturing industries TA 4.1: Cement sector TA 4.2: Aluminium TA 4.3: Iron and steel TA 4.4: Refinery	 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	Chemical industry TA 5.1: Chemical process industries	 <input type="checkbox"/>
6	Construction TA 6.1: Construction	 <input type="checkbox"/>
7	Transport TA 7.1: Transport	 <input type="checkbox"/>
8	Mining/mineral production TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below TA 8.2: Oil and gas industry, coal mine methane recovery and use	 <input type="checkbox"/> <input type="checkbox"/>
9	Metal production TA 9.1: Metal production	 <input type="checkbox"/>
10	Fugitive emissions from fuels TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below TA 10.2: Oil and gas industry, coal mine methane recovery and use	 <input type="checkbox"/> <input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride TA 11.1: Chemical process industries TA 11.2: GHG capture and destruction	 <input type="checkbox"/> <input type="checkbox"/>
12	Solvents use TA 12.1: Chemical process industries	 <input type="checkbox"/>
13	Waste handling and disposal TA 13.1: Waste handling and disposal TA 13.2: Animal waste management	 <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
14	Afforestation and reforestation TA 14.1: Forestry	 <input type="checkbox"/>
15	Agriculture TA 15.1: Agriculture TA 15.2: Animal waste management	 <input type="checkbox"/> <input type="checkbox"/>

Name: Mr Martin Enderlin, PhD

Scopes of expertise:

1	Energy industries (renewable/non-renewable sources) TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar TA 1.2: Energy generation from renewable energy sources	X X X
2	Energy distribution TA 2.1: Electricity distribution TA 2.2: Heat distribution	X <input type="checkbox"/> X
3	Energy demand TA 3.1 Energy demand	X X
4	Manufacturing industries TA 4.1: Cement sector TA 4.2: Aluminium TA 4.3: Iron and steel TA 4.4: Refinery	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	Chemical industry TA 5.1: Chemical process industries	<input type="checkbox"/> <input type="checkbox"/>
6	Construction TA 6.1: Construction	<input type="checkbox"/> <input type="checkbox"/>
7	Transport TA 7.1: Transport	X X
8	Mining/mineral production TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9	Metal production TA 9.1: Metal production	<input type="checkbox"/> <input type="checkbox"/>
10	Fugitive emissions from fuels TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride TA 11.1: Chemical process industries TA 11.2: GHG capture and destruction	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
12	Solvents use TA 12.1: Chemical process industries	<input type="checkbox"/> <input type="checkbox"/>
13	Waste handling and disposal TA 13.1: Waste handling and disposal TA 13.2: Animal waste management	X X <input type="checkbox"/>
14	Afforestation and reforestation TA 14.1: Forestry	<input type="checkbox"/> <input type="checkbox"/>
15	Agriculture TA 15.1: Agriculture TA 15.2: Animal waste management	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Name: Mr Oliver Stankiewicz

Scopes of expertise:

1	Energy industries (renewable/non-renewable sources)	X
	TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar	<input type="checkbox"/>
	TA 1.2: Energy generation from renewable energy sources	X
2	Energy distribution	<input type="checkbox"/>
	TA 2.1: Electricity distribution	<input type="checkbox"/>
	TA 2.2: Heat distribution	<input type="checkbox"/>
3	Energy demand	<input type="checkbox"/>
	TA 3.1 Energy demand	<input type="checkbox"/>
4	Manufacturing industries	<input type="checkbox"/>
	TA 4.1: Cement sector	<input type="checkbox"/>
	TA 4.2: Aluminium	<input type="checkbox"/>
	TA 4.3: Iron and steel	<input type="checkbox"/>
	TA 4.4: Refinery	<input type="checkbox"/>
5	Chemical industry	<input type="checkbox"/>
	TA 5.1: Chemical process industries	<input type="checkbox"/>
6	Construction	X
	TA 6.1: Construction	X
7	Transport	X
	TA 7.1: Transport	X
8	Mining/mineral production	<input type="checkbox"/>
	TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below	<input type="checkbox"/>
	TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
9	Metal production	<input type="checkbox"/>
	TA 9.1: Metal production	<input type="checkbox"/>
10	Fugitive emissions from fuels	<input type="checkbox"/>
	TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below	<input type="checkbox"/>
	TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	<input type="checkbox"/>
	TA 11.1: Chemical process industries	<input type="checkbox"/>
	TA 11.2: GHG capture and destruction	<input type="checkbox"/>
12	Solvents use	<input type="checkbox"/>
	TA 12.1: Chemical process industries	<input type="checkbox"/>
13	Waste handling and disposal	X
	TA 13.1: Waste handling and disposal	X
	TA 13.2: Animal waste management	X
14	Afforestation and reforestation	X
	TA 14.1: Forestry	X
15	Agriculture	X
	TA 15.1: Agriculture	X
	TA 15.2: Animal waste management	X

Name: Mrs Margit Haberreiter, PhD

Scopes of expertise:

1	Energy industries (renewable/non-renewable sources) TA 1.1: Thermal energy generation from fossil fuels as well as thermal energy from solar TA 1.2: Energy generation from renewable energy sources	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2	Energy distribution TA 2.1: Electricity distribution TA 2.2: Heat distribution	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
3	Energy demand TA 3.1 Energy demand	<input type="checkbox"/> <input type="checkbox"/>
4	Manufacturing industries TA 4.1: Cement sector TA 4.2: Aluminium TA 4.3: Iron and steel TA 4.4: Refinery	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5	Chemical industry TA 5.1: Chemical process industries	X X
6	Construction TA 6.1: Construction	<input type="checkbox"/> <input type="checkbox"/>
7	Transport TA 7.1: Transport	<input type="checkbox"/> <input type="checkbox"/>
8	Mining/mineral production TA 8.1: Mining and mineral processes, excluding those included in TA 8.2 below TA 8.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
9	Metal production TA 9.1: Metal production	<input type="checkbox"/> <input type="checkbox"/>
10	Fugitive emissions from fuels TA 10.1: Mining and mineral processes, excluding those included in TA 10.2 below TA 10.2: Oil and gas industry, coal mine methane recovery and use	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
11	Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride TA 11.1: Chemical process industries TA 11.2: GHG capture and destruction	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
12	Solvents use TA 12.1: Chemical process industries	X X
13	Waste handling and disposal TA 13.1: Waste handling and disposal TA 13.2: Animal waste management	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
14	Afforestation and reforestation TA 14.1: Forestry	<input type="checkbox"/> <input type="checkbox"/>
15	Agriculture TA 15.1: Agriculture TA 15.2: Animal waste management	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

10 Appendix E: Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CH ₄	Methane
CL	Clarification Request
CME	Coordinating or Managing Entity
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LED	Light Emitting Diode
MP	Monitoring Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PoA	Programme of Activity
SQS	Swiss Association for Quality and Management Systems
UNFCCC	United Nations Framework Convention on Climate Change

**Swiss Association for Quality and
Management Systems (SQS)**

B e r n s t r a s s e 1 0 3
P . O . B o x 6 8 6
C H - 3 0 5 2 Z o l l i k o f e n
T e l . + 4 1 3 1 9 1 0 3 5 3 5
F a x . + 4 1 3 1 9 1 0 3 5 4 5
h e a d o f f i c e @ s q s . c h
w w w . s q s . c h

CDM Validation Protocol

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Business account:
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Ms. Claudia Doets/ Mr Kim van der Leeuw

Phone:

Fax:

E-Mail:

Contact person:

Service

Audit/Assessment:

Audit/Assessment beginning/end:

Project name:

GBZ/Report-No.:

CDM PoA Validation

1 July 2010 – 05 December 2012

LED's kick-off

320846/P32017.33

UNFCCC Scope(s)/Technical area(s):

UNFCCC Methodology:

UNFCCC Scale:

SS 3. Energy Demand / TA 3.1 Energy Demand

AMS II.C. version 13.0 ; Demand-side energy efficiency
activities for specific technologies.

Small-Scale (SSC) (PoA)

Team of auditors/assessors:

Mr Zsolt Lengyel
Mr Martin Enderlin
Mr Oliver Stankiewicz
Ms Margit Haberreiter

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Introduction

[VVM] 26: The purpose of validation is to ensure a thorough, independent assessment of proposed CDM project activities submitted for registration as a proposed CDM project activity against the applicable CDM requirements.

[VVM] 35: The DOE shall raise a corrective action request (CAR) if one of the following occurs:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The CDM requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.

[VVM] 36: The DOE shall raise a clarification request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

[VVM] 37: The DOE shall raise a forward action request (FAR) during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

Normative References/Documents

No.	Title	Version
[1]	Clean Development Mechanism Validation and Verification Manual	1.2
[2]	Glossary of CDM terms	6
[3]	Modalities and Procedures for a Clean Development Mechanism	unedited
[4]	AMS-II.C.: Demand-side energy efficiency activities for specific technologies.	13
[5]	Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities EB 65 Annex 3	01.0
[6]	Non-binding best practice examples to demonstrate additionality for SSC project activities	unedited
[7]	Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities, EB 63 Annex 24.	
[8]		
[9]	Tool to calculate the emission factor for an electricity system	2.2.1
[10]	Tool for the demonstration and assessment of additionality	6.0.0
[11]	Standard for sampling and surveys for CDM project activities and programme of activities	2.0

Protocol 1: General CDM Requirements

Note: the template text refers to PDD; however in case of PoAs this term implies the full PoA documentation (PoA-DD, specific CPA, generic CPA).

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
1	Validation requirements based on paragraph 37 of the CDM modalities and procedures				
1.1	APPROVAL				
[1] 44	All Parties involved have approved the project activity.	8,9	DR	CAR2	OK
	Comment: CAR1: The LoAs from Host and Annex I party have to be obtained and submitted to SQS LoAs of both countries were received and therefore, CAR 1 was closed.				
1.1.1 [1] 45	The DOE shall determine whether the DNA of each Party indicated as being involved in the proposed CDM project activity in section A.3 of the PDD has provided a written letter of approval. The DOE shall determine whether each letter confirms that: (a) The Party is a Party to the Kyoto Protocol; (b) Participation is voluntary; (c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country; (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration.	8,9	DR	OK	OK
	Comment: The LoAs are in accordance with CDM modalities and procedures. Neither of the LoAs contains reference to the version number of the PDD.				
1.1.2 [1] 46	The DOE shall determine whether the letter(s) of approval is unconditional with respect to (a) to (d) above.	8,9	DR	OK	OK
	Comment: The LoAs are unconditional. SQS validated that these additional conditions (1 to 4) introduced by the DNA of The Republic of South Africa do not compromise VVM article 45-46 requirements. Therefore, the LoA of The Republic of South Africa is unconditional with respect to (a) to (d) above in 1.1.1(1)45.				
1.1.3 [1] 47	The DOE shall confirm that the letter(s) of approval was issued by the respective Party's designated national authority (DNA) and is valid for the proposed CDM project activity under validation. A list of DNAs is available on the UNFCCC CDM website.	8,9	DR	OK	OK
	Comment: The DOE received the Annex I LoAs and the Host Country LoA from the project participant directly.				
1.1.4 [1] 48	If the DOE doubts the authenticity of the letter of approval, the DOE shall verify with the DNA that the letter of approval is authentic.	8,9	DR	OK	OK
	Comment: The authenticity of both LoAs is unambiguous and has been checked with the issuing DNAs through their internet accessible issued LoA Lists.				
1.2	PARTICIPATION				
[1] 51	All project participants have been listed in a consistent manner in the project documentation. Also, their participation in the project activity was approved by a Party to the Kyoto Protocol.	6,8, 9,10	DR	OK	OK
	Comment: Documentation, including the MoC form, is consistent. The PPs' participation was approved by parties to the Kyoto Protocol.				
1.2.1 [1] 52	The DOE shall confirm that the project participants are listed in tabular form in section A.3 of the PDD and that this information is consistent with the contact details provided in Annex 1 of the PDD. The DOE shall determine whether the participation of each PP has been approved by at least one Party involved, either	6	DR	OK	OK

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable

CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	in a LoA or in a separate letter specifically to approve participation. The DOE shall confirm that no entities other than those approved as project participants are included in these sections of the PDD.				
	Comment: The PPs are listed appropriately in the PoA documentation and they are the only entities that were approved by the respective DNAs.				
1.2.2 [1] 53	The DOE shall ensure that the approval of participation was issued from the relevant DNA and if in doubt shall verify with the DNA that the approval of participation is valid for the proposed CDM project participant.	8,9	DR	OK	OK
	Comment: The authenticity of the LoAs is unambiguous.				
1.3	PROJECT DESIGN DOCUMENT				
[1] 55	The PDD used as a basis for validation shall be prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website.	6	DR	OK	OK
	Comment: The PoA documentation has used the latest template.				
1.3.1 [1] 56	The DOE shall determine whether the PDD is in accordance with the applicable CDM requirements for completing PDDs.	6	DR	OK	OK
	Comment: The PoA documentation is in full compliance with relevant forms and guidance.				
1.4	PROJECT DESCRIPTION				
[1] 58	The PDD shall contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.	6	DR	OK	OK
	Comment: Project activities both for the PoA level and the 1 st and the generic CPAs are clearly described.				
1.4.1 [1] 59	The DOE shall confirm that the description of the proposed CDM PoA as contained in the PoA documentation sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.	3	DR	CAR1 CAR3 CAR4 CAR5 CAR6 CAR7 CAR8 CAR9 CAR10 CAR11 CAR12 CL1 CL2 CL3 CL4 CL5 CL6 CL7 CL8 CL9 CL10 CL11 CL12 CL13	OK

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	<p>See Protocol 4 for the detailed description of the CAR-CLs.</p> <p>The PoA documentation has been amended and supportive materials have been provided regarding the above listed CLs and therefore these CLs have been closed.</p> <p>Comment:</p> <p>FAR1 was raised in order to ensure that not yet available documents/evidences will be obtained prior to the first periodic verification.</p> <p>The PoA project description is therefore accurate and complete.</p>			CL44 FAR1	
1.4.2 [1] 60	<p>For proposed CDM project activities in existing facilities or utilizing existing equipments, the DOE shall conduct a physical site inspection to confirm that the description in the PDD reflects the proposed CDM project activity for the following types of CDM project activities unless other means are specified in the methodology:</p> <p>(a) Large scale projects;</p> <p>(b) Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year;</p> <p>(c) Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes per year; in such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis.</p>	6,16 -20	DR, I	OK	OK
	<p>Comment: The on-site visit obtained information and additional evidences confirmed that the description in the 1st CPA reflects the proposed CDM PoA CPA project activity accurately.</p>				
1.4.3 [1] 61	<p>For other individual proposed small scale CDM project activities with emission reductions not exceeding 15 000 tonnes per year, the DOE may conduct a physical site visit as appropriate.</p>			N/A	N/A
	<p>Comment:</p>				
1.4.4 [1] 62	<p>For all other proposed CDM project activities not referred to in paragraphs 59-61, the DOE shall undertake the validation by reviewing available designs and feasibility studies and may conduct comparison analysis to equivalent projects, as appropriate. The DOE may conduct physical site visit to assess the plan. For proposed CDM project activities for which the DOE does not undertake a physical site inspection, this shall be appropriately justified.</p>			N/A	N/A
	<p>Comment:</p>				
1.4.5 [1] 63	<p>If the proposed CDM project activity involves the alteration of an existing installation or process, the DOE shall ensure that the project description clearly states the differences resulting from the project activity compared to the pre-project situation.</p>			N/A	N/A
	<p>Comment:</p>				
1.5	BASELINE AND MONITORING METHODOLOGY				
1.5.1	General requirement				
1.5.1.1 [1] 65	<p>The DOE shall ensure that the baseline and monitoring methodologies selected by the project participants comply with the methodologies previously approved by the CDM Executive Board.</p>	6	DR	OK	OK
	<p>Comment: The baseline and monitoring methodology used in the project fully complies with CDM EB requirements.</p>				

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
1.5.1.2 [1] 66	To ensure that the project activity meets this general requirement, the DOE shall determine whether: (a) The selected methodology is applicable to the project activity; (b) The PP has correctly applied the selected methodology.	6	DR	OK	OK
	Comment: The baseline and monitoring methodology used in the project fully complies with CDM EB requirements.				
1.5.1.3 [1] 67	The DOE shall ensure that the selected methodology applies to the project activity and has correctly been applied with respect to the following: (a) Project boundary; (b) Baseline identification; (c) Algorithms and/or formulae used to determine emission reductions; (d) Additionality; (e) Monitoring methodology.	6	DR	CAR1 CAR6 CAR7	OK
	Comment: CAR 1: The first specific CPA document has to be submitted in order to be able to upload the „LED's kick-off" project documentation for Global Stakeholder Commenting at the UNFCCC website. PoA documentation amended therefore CAR 1 is closed. CAR 6: The PoA DD, generic CPA-DD and 1st CPA DD need to reflect actual progress/changes occurred during the 14 months since requesting the LoA of the Host Country. This updating shall include the grid emission factor for which both the methodology and the available historical electricity date have changed.. CPA documentation amended therefore CAR 6 is closed. CAR 7: The PoA DD, generic CPA-DD and 1st CPA DD need to reflect UNFCCC standard and tool changes occurred during the 14 months since requesting the LoA of the Host Country. This updating shall address EB 65 PoA Standard (Annex 3), Sampling and Survey standard (Annex 2) and other applicable PoA related decisions (e.g. EB 63 Annex 23, EB 63 Annex 24) CPA documentation amended therefore CAR 7 is closed.				
1.5.2	Applicability of the selected methodology to the project activity				
[1] 68	The DOE shall validate that the selected baseline and monitoring methodology previously approved by the CDM Executive Board is applicable to the project activity, including that the used version is valid.	6	DR	OK	OK
	Comment: The methodology is applicable and the version used is the latest one available.				
[1] 69	The DOE shall apply specific guidance provided by the CDM Executive Board in respect to any approved methodology.	6	DR	OK	OK
	Comment: The applicability of the methodology is unambiguous.				
1.5.2.1 [1] 70	The DOE shall determine whether the methodology is correctly quoted and applied by comparing it with the actual text of the applicable version of the methodology available on the UNFCCC CDM website.	6	DR	CAR7	OK
	Comment: CAR 7: The PoA DD, generic CPA-DD and 1st CPA DD need to reflect UNFCCC standard and tool changes occurred during the 14 months since requesting the LoA of the Host Country. This updating shall address EB 65 PoA Standard (Annex 3), Sampling and Survey standard (Annex 2) and other applicable PoA related decisions (e.g. EB 63 Annex 23, EB 63 Annex 24) CPA documentation amended therefore CAR 7 is closed. The methodology and its supporting tools are correctly quoted and applied.				
1.5.2.2 [1] 71	A selected approved methodology applies to the project activity if the applicability conditions of the methodology are met and the project activity is not expected to result in emissions other than those allowed by the methodology. The DOE shall determine whether the choice of methodology is justified, and the project participants have shown that the project activity meets each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein. This shall be done by validating the	6	DR	OK	OK

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	documentation referred to in the PDD and by verifying that its content is correctly quoted and interpreted in the PDD. If the DOE, based on local and sectoral knowledge, is aware that comparable information is available from sources other than the one used in the PDD, then the DOE shall cross check the PDD against the other sources to confirm that the project activity meets the applicability conditions of the methodology.				
	Comment: The proposed PoA project activity is in line with applicability criteria. Therefore, the validation opinion is unambiguous regarding the applicability of the selected methodology to the proposed CDM PoA.				
1.5.2.3 [1] 72	If the DOE cannot make a determination regarding the applicability of the selected methodology to the proposed CDM project activity, the DOE shall request clarification of the methodology in accordance with the guidance provided by the CDM Executive Board.			N/A	N/A
	Comment:				
1.5.2.4 [1] 73	If the DOE determines that the proposed CDM project activity does not comply with the applicability conditions of the methodology, the DOE may proceed by means of requesting revision to or deviation from the methodology in accordance with the guidance provided by the CDM Executive Board.			N/A	N/A
	Comment:				
1.5.2.5 [1] 74	If the DOE has requested clarification of revision to or deviation from a methodology, the DOE shall not submit a request for registration until the CDM Executive Board has approved the proposed deviation or revision.			N/A	N/A
	Comment:				
1.5.2.6 [1] 75	Under no circumstance shall the DOE consider the submission of a request for registration as a means of seeking clarification from the CDM Executive Board on the applicability of a methodology.			N/A	N/A
1.5.3	Project boundary				
[1] 78	The PDD shall correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity.	6	DR	OK	OK
	Comment: Project boundary is appropriately described.				
1.5.3.1 [1] 79	Based on documented evidence and corroborated by a site visit where required by paragraphs 59-62 above, the DOE shall determine whether the delineation in the PDD of the project boundary is correct and meets the requirements of the selected baseline methodology. The DOE also shall confirm that all sources and GHGs required by the methodology have been included within the project boundary. If the methodology allows project participants to choose whether a source or gas is to be included within the project boundary, the DOE shall determine whether the project participants have justified that choice. The DOE shall confirm that the justification provided is reasonable, based on assessment of supporting documented evidence provided by the project participants and corroborated by observations if required.	6, 16- 20	DR	OK	OK
	Comment: Project boundary is appropriately described.				
1.5.4	Baseline identification				

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
[1] 81	The PDD shall identify the baseline for the proposed CDM project activity, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity.	6	DR	OK	OK
	Comment: Baseline has been established in line with the methodology.				
[1] 82	The DOE shall confirm that any procedure contained in the methodology to identify the most reasonable baseline scenario has correctly been applied. If the selected methodology requires use of tools (such as the "Tool for the demonstration and assessment of additionality" and the "Combined tool to identify the baseline scenario and demonstrate additionality") to establish the baseline scenario, the DOE shall consult the methodology on the application of these tools. In such cases, the guidance in the methodology shall supersede the tool. The DOE shall check each step in the procedure described in the PDD against the requirements of the methodology.	6	DR	OK	OK
	Comment: The identification of the most reasonable baseline scenario has correctly been conducted.				
1.5.4.1 [1] 83	If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, the DOE shall, based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario was excluded.			N/A	N/A
	Comment:				
1.5.4.2 [1] 84	The DOE shall determine whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used as described in the PDD. It shall ensure that documents and sources referred to in the PDD are correctly quoted and interpreted. The DOE shall cross check the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available.	6	DR	OK	OK
	Comment: Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable.				
1.5.4.3 [1] 85	The DOE shall determine whether all applicable CDM requirements have been taken into account in the identification of the baseline scenario for the proposed CDM project activity, including "relevant national and/or sectoral policies and circumstances." Drawing on its knowledge of the sector and/or advice from local experts, the DOE shall confirm that all relevant policies and circumstances have been identified and correctly considered in the PDD, in accordance with the guidance by the CDM Executive Board.	6,14 ,27, 28,3 0,31	DR	OK	OK
	Comment: Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.				
1.5.4.4 [1] 86	The DOE shall determine whether the PDD provides a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity.	6	DR	OK	OK
	Comment: The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.				
1.5.5	Algorithms and/or formulae used to determine emission reductions				

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
[1] 89	The steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions shall comply with the requirements of the selected baseline and monitoring methodology.	6,7	DR	OK	OK
	Comment: The equations applied to calculate project emissions, baseline emissions, leakage and emission reductions are compliant with the methodology and its applicable tools.				
1.5.5.1 [1] 90	The DOE shall determine whether the equations and parameters in the PDD were correctly applied by comparing them to those in the selected approved methodology. If the methodology provides for selection between different options for equations or parameters, the DOE shall confirm that adequate justification was provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided) and that the correct equations and parameters were used, in accordance with the methodology selected.	6,7	DR	OK	OK
	Comment: All assumptions and data used by the PPs are listed in the PoA documentation, including their references and sources. All documentation used by the PPs as the basis for assumptions and source of data is correctly quoted and interpreted in the PoA documentation.				
1.5.5.2 [1] 91	The DOE shall verify the justification given in the PDD for the choice of data and parameters used in the equations. If data and parameters will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remain fixed throughout the crediting period, the DOE shall assess that all data sources and assumptions are appropriate and that calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions. If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, the DOE shall confirm that the estimates provided in the PDD for these data and parameters are reasonable.	6,7	DR	OK	OK
	Comment: All values used in the PoA Documentation are considered reasonable in the context of the proposed CDM project activity. The baseline methodology was applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PoA documentation.				
1.6	ADDITIONALITY OF A PROJECT ACTIVITY				
	The PDD shall describe how a proposed CDM project activity is additional.	6	DR	CAR9	OK
[1] 94	Comment: The PoA documentation sufficiently describes the additionality of the project, however one car was raised: CAR 9: Within SSC projects the barrier analysis approach can be carried out by different ways including the techniques that resemble the elements of the Combined Tool. The SSC guidelines referred in para 7 of the "General guidelines to SSC CDM methodologies", namely EB 35 Annex 34 and EB 50 Annex 13 do not provide guidance on how to conduct the Barrier analysis neither the Tools for conducting the Barrier analysis. Therefore the elements of the Combined Tool have been regularly used by registered SSC projects to substantiate that the prevailing/common practice & technology barrier is the decisive additionality factor. However, as the SSC methodologies do NOT require the compulsory use of the Combined Tool therefore the PoA DD wording is ambiguous in its references to the Combined Tool. PoA documentation has been amended therefore CAR 9 is closed.				
1.6.1 [1]	The DOE shall assess and verify the reliability and credibility of all data, rationales, assumptions, justifications and documentation provided by project	6	DR	OK	OK

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
95	participants to support the demonstration of additionality. This requires the DOE to critically assess the presented evidence, using local knowledge and sectoral and financial expertise.				
	Comment: The PoA documentation describes the relevant aspects of the LED lighting activities covered by the PoA in a reliable and credible manner.				
1.6.2 [1] 96	The DOE shall consider tools and documents provided by the CDM Executive Board to demonstrate the additionality of proposed CDM project activities as well as specific complementary or alternative requirements included in approved CDM methodology.	6	DR	OK	OK
	Comment: The small scale additionality guidance is used and no alternative/additional requirements are applicable. See CAR 9 above ((1)94.)				
1.6.1	Prior consideration of the clean development mechanism				
[1] 98	If the project activity start date is prior to the date of publication of the PDD for stakeholder comments, it shall be demonstrated that the CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity.	6	DR	OK	OK
	Comment: Though the DOE is not required to assess prior consideration of CDM for PoAs in line with EB 62 Annex 13 requirements, it is confirmed that the first component of the programme will commence after the starting date of validation.				
1.6.1.1 [1] 99	The DOE shall confirm that the start date of the project activity, reported in the PDD, is in accordance with the "Glossary of CDM terms". If the reported date is not in accordance with the glossary, the DOE shall raise a CAR to ensure that the start date is correctly reported in a revised PDD. In particular, for project activities that require construction, retrofit or other modifications, the date of commissioning cannot be considered the project activity start date.	6	DR	OK	OK
	Comment: Though the DOE is not required to assess prior consideration of CDM for PoAs in line with EB 62 Annex 13 requirements, it is confirmed that the first component of the programme will commence after the starting date of validation.				
1.6.1.2 [1] 100	The DOE, in accordance with the guidance from the CDM Executive Board, shall determine whether it is a new project activity (a project activity with a start date on or after 02/08/2008) or an existing project activity (a project activity with a start date before 02/08/2008).	6	DR	OK	OK
	Comment: The project is a "new project activity" according to the EB guidance.				
1.6.1.3 [1] 101	For a new project activity, for which the PDD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, the DOE shall ensure by means of confirmation from the UNFCCC secretariat that PPs had informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. If such a notification has not been provided by the project participants within six months of the project activity start date, the DOE shall determine that the CDM was not seriously considered in the decision to implement the project activity.	6	DR	OK	OK
	Comment: Prior consideration confirmation to the UNFCCC of a PoA is not applicable (see 1.6.1.2).				
1.6.1.4 [1] 102	For an existing project activity, for which the start date is prior to the date of publication of the PDD for global stakeholder consultation, the DOE shall assess the project participant's prior consideration of the CDM through document reviews and shall satisfy following requirements: (a) Evidence which must indicate that the awareness of the CDM prior to the project activity start date, and that the benefits of the CDM, were a decisive factor in the decision to proceed with the project. Evidence to support this would			N/A	N/A

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity. (b) Reliable evidence from project participants which must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA or the UNFCCC secretariat.				
	Comment:				
1.6.1.5 [1] 103	If evidence to support the serious prior consideration of the CDM as indicated above is not available, the DOE shall determine that the CDM was not considered in the decision to implement the project activity.			N/A	N/A
	Comment:				
1.6.2	Identification of alternatives				
[1] 105	The PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required.	6	DR	OK	OK
	Comment: The PoA follows the approved methodology in establishing the baselines for the "brownfield" and "greenfield" project component activities.				
1.6.2.1 [1] 106	The DOE shall assess the list of alternatives given in the PDD and ensure that: (a) The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity; (b) The list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity; (c) The alternatives comply with all applicable and enforced legislation.	6	DR	OK	OK
	Comment: See 1.5.4. and 1.6.2 above.				
1.6.3	Investment analysis				
[1] 108	If the investment analysis has been used to demonstrate the additionality of the proposed CDM project activity, the PDD shall provide evidence that the proposed CDM project activity would not be: (a) The most economically or financially attractive alternative; or (b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).	6	DR	OK	OK
	Comment: Investment analysis has not been used; This is appropriate according to the SSC methodology. See details about the barrier analysis – including finance barrier – below.				
[1] 109	Project participants can show this through one of the following approaches, by demonstrating that: (a) The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified, and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;	6	DR	OK	OK

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	(b) The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative; (c) The financial returns of the proposed CDM project activity would be insufficient to justify the required investment.				
	Comment: See [1] 108 above.				
[1] 110	The DOE shall comply with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM Executive Board and with other relevant guidance, including the latest guidelines on plant load factors "guidelines for the reporting and validation of plant load factors".	6	DR	OK	OK
	Comment: See [1] 108 above.				
1.6.3.1 [1] 111	To verify the accuracy of financial calculations carried out for any investment analysis, the DOE shall: (a) Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices; (b) Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices; (c) Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants; (d) Assess the correctness of computations carried out and documented by the project participants; (e) Assess the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur and the likelihood of these conditions.	6	DR	OK	OK
	Comment: See [1] 108 above.				
1.6.3.2 [1] 112	To confirm the suitability of any benchmark applied in the investment analysis, the DOE shall: (a) Determine whether the type of benchmark applied is suitable for the type of financial indicator presented; (b) Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity; (c) Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants involved, and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.	6	DR	OK	OK
	Comment: See [1] 108 above.				
1.6.3.3 [1] 113	The CDM Executive Board clarified that in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activities, DOEs are required to ensure that: (a) The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed; (b) The values used in the PDD and associated Annexes are fully consistent with the FSR, and where inconsistencies occur, the DOE should validate the appropriateness of the values;			N/A	N/A

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	(c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.				
	Comment: FSR or similar studies are not required by South African authorities.				
1.6.4	Barrier analysis				
[1] 115	If barrier analysis was used to demonstrate the additionality of the proposed CDM project activity, the PDD shall demonstrate that the proposed CDM project activity faces barriers that: (a) Prevent the implementation of this type of proposed CDM project activity; (b) Do not prevent the implementation of at least one of the alternatives.	6,15 ,30, 31	DR	OK	OK
	Comment: The barrier analysis has been carried out appropriately.				
1.6.4.1 [1] 116	Issues that have a clear direct impact on the financial returns of the project activity cannot be considered barriers and shall be assessed by investment analysis. This does not refer to either: (a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance, or (b) Barriers related to the unavailability of sources of finance for the project activity.	6,15 ,30, 31	DR	OK	OK
	Comment: The access to finance barrier did not include any issues that are related to the financial returns of the project. Therefore, the barrier analysis has been approximately conducted (and no investment analysis is required)				
1.6.4.2 [1] 117	The DOE shall apply a two-step process to assessing the barrier analysis performed as follows: (a) <i>Determine whether the barriers are real.</i> The DOE shall assess the available evidence and/or undertake interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) to determine whether the barriers listed in the PDD exist. The DOE shall ensure that existence of barriers is substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics. If existence of a barrier is substantiated only by the opinions of the project participants, the DOE shall not consider this barrier to be adequately substantiated. If the DOE considers, on the basis of its sectoral or local expertise, that a barrier is not real or is not supported by sufficient evidence, it shall raise a CAR to have reference to this barrier removed from the project documentation; (b) <i>Determine whether the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives.</i> Since not all barriers present an insurmountable hurdle to a project activity being implemented, the DOE shall apply its local and sectoral expertise to judge whether a barrier or set of barriers would prevent the implementation of the proposed CDM project activity and would not equally prevent implementation of <i>at least one of the possible alternatives</i> , in particular the identified baseline scenario.	6,15 ,30- 47	DR	OK	OK
	Comment: Each barrier presented has been cross- checked with independent, third-party evidence. The identified barriers are both real and preventive.				
1.6.5	Common practice analysis				
[1] 119	For proposed large-scale CDM project activities, unless the proposed project type is first-of-its kind, common practice analysis shall be carried out as a credibility check of the other available evidence used by the project participants to demonstrate additionality. This is a test to complement the investment analysis (Step 2 of the additionality tool) or barrier analysis (Step 3 of the	6	DR	OK	OK

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	<p>additionality tool) to confirm that the project activity is not widely observed and commonly carried out in the region.</p> <p>Given that the LED's kick-off PoA implements a small-scale technology, i.e. efficient lighting equipment, EB63 Annex 12: Guidelines on Common Practice (version 01.0) is not used, since it is considered not applicable to the type of project activity implemented under this programme</p> <p>Comment: However, the project participants performed a common- practice analysis. SQS confirmed that the LED lighting equipment penetration rate is below any measurable rate of the total lighting market. This results in a share of LED lighting (F) of 0.00% and can be deemed a marginal proportion of the total market.</p>				
1.6.5.1 [1] 120	<p>The DOE shall use its local and sectoral expertise to:</p> <p>(a) Assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity's technology or industry type. For certain technologies, the relevant region for assessment will be local. For others, it may be transnational/global. If a region other than the entire host country is chosen, the DOE shall assess the explanation why this region is more appropriate;</p> <p>(b) Using official sources as well as local and industry expertise, determine to what extent similar and operational projects (e.g., using similar technology or practice), other than CDM project activities, were undertaken in the defined region;</p> <p>(c) If similar and operational projects, other than CDM project activities, are already "widely observed and commonly carried out" in the defined region, assess whether there are essential distinctions between the proposed CDM project activity and the other similar activities.</p> <p>Comment: The proposed 1st CPA activity is not common practice. See (1)119. above.</p>	6	DR	OK	OK
1.7	MONITORING PLAN				
[1] 122	<p>The PDD shall include a monitoring plan. This monitoring plan shall be based on the approved monitoring methodology applied to the proposed CDM project activity.</p> <p>Comment: The monitoring plan is based on the approved monitoring methodology. However, CAR3, CAR4 and CAR10 was raised to address non-conformities and toll changes with sampling requirements. After the amendment of the PoA documentation these CARs were closed.</p>	6	DR	CAR3 CAR4 CAR10	OK
1.7.1 [1] 123	<p>The DOE shall apply a two-step process to assessing compliance with this requirement as follows:</p> <p>(a) <i>Compliance of the monitoring plan with the approved methodology.</i> The DOE shall:</p> <p>(i) By means of document review, identify the list of parameters required by the selected approved methodology;</p> <p>(ii) Confirm that the monitoring plan contains all necessary parameters, that they are clearly described and that the means of monitoring described in the plan complies with the requirements of the methodology;</p> <p>(b) <i>Implementation of the plan.</i> The DOE shall, by means of review of the documented procedures, interviews with relevant personnel, project plans and any physical inspection of the proposed CDM project activity site in accordance with paragraphs 59-62, assess whether:</p> <p>(i) The monitoring arrangements described in the monitoring plan are feasible within the project design;</p> <p>(ii) The means of implementation of the monitoring plan, including the data</p>	6	DR	OK	OK

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable

CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.				
	Comment: The monitoring plan is in compliance with the requirements of the methodology.				
1.8	SUSTAINABLE DEVELOPMENT				
[1] 125	CDM project activities shall assist Parties not included in Annex I to the convention in achieving sustainable development.	6,8	DR	OK	OK
	Comment: The host country LoA explicitly refers to the project benefits to sustainable development.				
1.8.1 [1] 126	The DOE shall determine whether the letter of approval by the DNA of the host Party confirms the contribution of the proposed CDM project activity to the sustainable development of the host Party.	6,8	DR	OK	OK
	Comment: The host party's DNA confirmed the contribution of the project to the sustainable development of the host party.				
1.9	LOCAL STAKEHOLDER CONSULTATION				
[1] 128	Local stakeholders shall be invited by the PPs to comment on the proposed CDM project activity prior to the publication of the PDD on the UNFCCC website.	6,52	DR	OK	OK
	Comment: LSC has been conducted and documented appropriately.				
1.9.1 [1] 129	The DOE shall, by means of document review and interviews with local stakeholders as appropriate, determine whether: (a) Comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited; (b) The summary of the comments received as provided in the PDD is complete; (c) The project participants have taken due account of any comments received and have described this process in the PDD.	6,53	DR	CAR5	OK
	Comment: The local stakeholder consultation was appropriately and adequately conducted. CAR5 was raised to provide full details and evidences for the LSC. CAR5 was closed after amending of the PoA and provision of evidence.				
1.10	ENVIRONMENTAL IMPACTS				
[1] 131	Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity in accordance with paragraph 37(c) of the CDM modalities and procedures.	6,37	DR	OK	OK
	Comment: The potential impact of LEDs and the environmental impacts associated with demand side energy measures have been documented and referred to in the PoA documentation.				
1.10.1 [1] 132	The DOE shall confirm, by means of a document review and/or using local official sources and expertise, whether the project participants have undertaken an analysis of environmental impacts and, if required by the host Party, an environmental impact assessment.	6	DR	OK	OK
	Comment: No EIA is required for this demand side measure of LED lighting/luminaries				
2	Specific validation activities				
2.1	BACKGROUND				
[1] 134	Project participants may contract a DOE to undertake certain specific validation activities. For such validation activities, the DOE shall apply the general means of validation and reporting requirements described above as well as those described below.				

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
2.2	PROJECT DESIGN OF SMALL-SCALE CLEAN DEVELOPMENT MECHANISM PROJECT ACTIVITIES				
[1] 135	The DOE shall determine whether a proposed small-scale CDM project activity meets the requirements of the simplified modalities and procedures for small-scale CDM project activities.	6	DR	OK	OK
	Comment: The PoA meets the requirements of the simplified modalities and procedures for small-scale CDM project activities				
2.2.1 [1] 136	During its validation of a small-scale project activity, the DOE shall confirm that: (a) The project activity qualifies within the thresholds of the three possible types of small-scale project activities. It may include more than one component; for example, a type III methane recovery component activity and a type I electricity component activity; (b) The project activity conforms to one of the approved small-scale categories and applies the relevant tool or methodology. The DOE shall confirm that the small-scale methodologies are applied in conjunction with the general guidelines to SSC CDM methodologies, which provides guidelines on equipment capacity, equipment performance/lifetime, baseline identification for type-II/III Greenfield project activities, sampling and other monitoring-related issues; (c) The project activity is not a debundled component of a large-scale project, in accordance with the rules defined in Appendix C of the simplified modalities and procedures for small-scale CDM project activities; (d) Whether an assessment of the environmental impacts of the proposed CDM project activity is required by the host Party.	6	DR	OK	OK
	Comment: The PoA is in conformity with all applicable SSC requirements.				
2.3	AFFORESTATION OR REFORESTATION PROJECT ACTIVITIES UNDER THE CLEAN DEVELOPMENT MECHANISM				
2.3.1	General requirement				
[1] 138	The guidance provided in section 1 above also applies to the validation of A/R CDM project activities to the extent defined in modalities and procedures for afforestation or reforestation (A/R) CDM project activities and relevant guidance by the CDM Executive Board.			N/A	N/A
	Comment:				
2.3.1.1 [1] 139	In addition, the DOE shall confirm that specific requirements, as defined in the modalities and procedures for A/R CDM project activities, were followed, including: (a) Project boundary for A/R CDM project activities; (b) Selection of carbon pools; (c) Eligibility of land; (d) Approach proposed to address non permanence; (e) Timing of management activities, including harvesting cycles, and verifications; (f) Socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems.			N/A	N/A
	Comment:				
2.3.2	Project boundary for A/R CDM project activities				
[1] 140	The PDD shall contain a description of the project boundary that geographically delineates the proposed afforestation or reforestation CDM project activity under the control of the project participants. The proposed A/R CDM project activity may contain more than one discrete area of land.			N/A	N/A

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	Comment:				
2.3.2.1 [1] 141	The DOE shall confirm whether the PDD contains a description of the CDM project boundary which encircles discrete areas of land planned for the proposed afforestation or reforestation CDM project activity under the control of the project participants.				
	Comment:				
2.3.2.2 [1] 142	The DOE shall, through document review and/or interviews, validate that the project participants for all areas of land planned for A/R CDM project activity: (a) Have already established the control over afforestation or reforestation activities; or (b) The control over afforestation or reforestation is expected to be established in accordance to the guidance specified in the EB 44 report, Annex 16. The control has to include at minimum the exclusive right, defined in a way acceptable under the legal system of the host country, to perform the A/R activity with the aim of achieving net anthropogenic GHG removals by sinks. If the total number of documents to be reviewed and persons/entities to be interviewed is not less than ten, then the DOE may apply a sampling approach.			N/A	N/A
	Comment:				
2.3.3	Selection of carbon pools				
[1] 144	Proposed A/R CDM project activity may account for verifiable changes in the following carbon pools within the project boundary: above-ground biomass, below-ground biomass, litter, dead wood, and soil organic carbon.			N/A	N/A
	Comment:				
2.3.3.1 [1] 145	The DOE shall determine whether the PDD selected the carbon pools to be considered in the proposed A/R CDM project activity in accordance with the requirements of the selected approved methodology. If the approved methodology allows for an option to exclude certain carbon pools, the DOE shall confirm that verifiable information was provided to justify the exclusion. For this, the DOE shall ensure that all documents referred to in the PDD are correctly quoted and interpreted. If relevant, the DOE shall cross check the information provided in the PDD with other available information from public sources or local experts.			N/A	N/A
	Comment:				
2.3.4	Eligibility of land				
[1] 147	Project participants shall provide evidence that the land within the planned project boundary is eligible for a proposed A/R CDM project activity following the most recent version of the "Procedures to demonstrate the eligibility of land for A/R CDM project activities".			N/A	N/A
	Comment:				
2.3.4.1 [1] 148	The DOE shall validate, based on review of information that reliably discriminates between forest and non-forest land according to the particular thresholds adopted by the host country (exemplary sources are listed in the abovementioned procedures) and a site visit, that the area of land included within the project boundary is eligible for afforestation or reforestation activity.			N/A	N/A
	Comment:				

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable

CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
2.3.5	Conservative choice and application of default data				
[1] 150	Project participants shall ensure that application of default data in estimation of the net anthropogenic GHG removals by sinks results in conservative, but not overly conservative, estimates. An acceptable method for satisfying the above-mentioned requirement is provided in the most recent version of the "Guidelines on conservative choice and application of default data in estimation of the net anthropogenic GHG removals by sinks".			N/A	N/A
	Comment:				
2.3.5.1 [1] 151	The DOE shall review the PDD to ensure satisfactory application of "Guidelines on conservative choice and application of default data in estimation of the net anthropogenic GHG removals by sinks" in order to prevent any overestimation of reductions in anthropogenic emissions according to the provisions of the modalities and procedures for afforestation and reforestation CDM project activities.			N/A	N/A
	Comment:				
2.3.6	Approach proposed to address non permanence				
[1] 153	Project participants shall specify the approach proposed to address non permanence in accordance with paragraph 38 of the modalities and procedures for afforestation or reforestation CDM project activities.			N/A	N/A
	Comment:				
2.3.6.1 [1] 154	The DOE shall review the PDD to ensure an approach to address that non permanence is selected according to the provisions of the modalities and procedures for afforestation or reforestation CDM project activities.			N/A	N/A
	Comment: The validation report shall describe the approach selected by the project participants to address non permanence.				
2.3.7	Timing of management activities, including harvesting cycles, and verifications				
[1] 156	Project participants shall plan management activities, including harvesting cycles, and verifications such that a systematic coincidence of verification and peaks in carbon stocks would be avoided.			N/A	N/A
	Comment:				
2.3.7.1 [1] 157	The DOE shall review the forest management plan and the monitoring plan for the proposed A/R CDM project activity to ensure that a systematic coincidence of verification and peaks in carbon stocks is avoided.			N/A	N/A
	Comment:				
2.3.8	Socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems				
[1] 159	Project participants shall submit to the DOE documentation on their analysis of the socioeconomic and environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project boundary of the proposed afforestation or reforestation project activity under the CDM.			N/A	N/A
	Comment:				
2.3.8.1 [1] 160	The DOE shall confirm, by means of a document review and/or using local official sources and expertise, whether the project participants have undertaken an analysis of the socio-economic and environmental impacts, including impacts on biodiversity and natural ecosystems, and impacts outside the project			N/A	N/A

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	boundary.				
	Comment:				
2.3.8.2 [1] 161	Should the above-mentioned analysis lead to conclusion that any negative impact that may be considered significant by the project participants or the host Party was detected, then the DOE shall, by means of document review, ascertain that a socio-economic impact assessment and/or an environmental impact assessment has been undertaken in accordance with relevant host Party regulations, and that the outcome of such impact assessment is summarized in the PDD. The DOE shall also ascertain that a description of the planned monitoring and remedial measures to address the negative impacts has been included in the PDD.			N/A	N/A
	Comment:				
2.4	PROJECT DESIGN OF SMALL-SCALE AFFORESTATION OR REFORESTATION PROJECT ACTIVITIES				
[1] 163	Small-scale afforestation or reforestation CDM project activities shall be validated using the requirements for afforestation or reforestation CDM project activities as described in section 2.3 above, while taking into account the simplified modalities and procedures for small-scale afforestation and reforestation CDM project activities.			N/A	N/A
	Comment:				
2.4.1 [1] 164	During its validation of a proposed small-scale A/R CDM project activity, the DOE shall determine whether: (a) The project activity complies with the thresholds for the small-scale A/R CDM project activities; (b) The project activity complies with one of the types of small-scale A/R project activities defined in Appendix B of the Annex to decision 6/CMP.1 and qualifies to apply one of the approved simplified baseline and monitoring methodology for small-scale afforestation and reforestation project activities; (c) The proposed CDM project activity is not a part of a debundled large-scale A/R project activity, in accordance with the rules defined in Appendix C of the Annex to decision 6/CMP.1; (d) The proposed CDM project activity was developed or implemented by low-income communities and individuals as confirmed by the host Party.			N/A	N/A
	Comment:				
2.5	PROGRAMME OF ACTIVITIES				
[1] 165	The CDM Executive Board has provided guidance and procedures for registering a programme of activities (PoA) as a single CDM project activity. In validating a PoA and any CDM programme activities (CPAs) proposed to be included in the PoA, the DOE shall, in general, apply the means of validation and reporting requirements described in this Manual. However, there are a number of requirements unique to PoAs for which additional instructions are provided below. The precise extent of validation required in each of these areas will need to be determined by the DOE, based on the type or PoA being validated.			N/A	N/A
	Comment:				
2.5.1	Operational and management arrangements for the PoA				

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
[1] 166	The DOE shall assess the operational and management arrangements which have been established by the coordinating/managing entity in order to determine whether these arrangements are suitable for the PoA being validated. The arrangements shall be sufficient to ensure that the coordinating/managing entity will have control of all records and information related to the implementation of individual CPAs and will be in a position to ensure that each CPA is being operated in accordance with the specific requirements of the programme. Where the DOE considers the arrangements to be unsatisfactory or insufficient, a CAR shall be raised. A request for registration shall not be submitted until the CAR has been resolved to the satisfaction of the DOE.			N/A	N/A
	Comment:				
2.5.2	Eligibility criteria for CPAs				
[1] 167	The DOE shall assess the specified eligibility criteria in the POA-DD in order to determine whether or not these criteria are sufficient to ensure that all CPAs would comply with the CDM requirements applicable to the PoA. These requirements will include, inter alia, the means of demonstrating the additionality of the CPA and the applicability of the applied methodology. The eligibility criteria represent an essential element of ensuring the smooth functioning or programmatic CDM. Therefore, the DOE may raise CARs which ensure the ease of application of the eligibility criteria.			N/A	N/A
	Comment:				
2.5.3	Validation of CPAs				
[1] 168	The DOE shall assess any proposed CPA, which a coordinating/managing entity wishes to include in the PoA, to determine whether or not it complies with the eligibility criteria specified in the POA-DD. The means of validation to determine compliance with this requirement will be specific to the PoA. The DOE may consider a desk review of the documentation sufficient to determine compliance in certain instances. It may also consider follow-up interviews and/or site visits necessary for other types of PoA.			N/A	N/A
	Comment:				
2.6	RENEWAL OF CREDITING PERIOD				
[1] 169	When contracted to validate a proposed CDM project activity for a second or further crediting period, the DOE shall undertake a thorough reassessment of the validity of the original baseline or any updates thereto proposed by the project participants, and the corresponding estimation of emission reductions for the applicable crediting period, based on the latest version of the procedures for renewing the crediting period, the latest applicable version of approved methodology and the means of validation described in this Manual.			N/A	N/A
	Comment:				
2.7	CHANGES TO THE START DATE OF THE CREDITING PERIOD				
[1] 170	The CDM Executive Board has revised procedures for requesting post registration changes to the start date of the crediting period. The requirement for the Host Country to re-confirm that the delay in the start date of crediting period will not affect project's contribution to sustainable development was removed, and that these revised procedures also contain provisions for project activities hosted in Least Developed Countries (LDCs). If project participants wish to delay the start date of the crediting period by more than one year but less than two			N/A	N/A

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	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	years, and if project participants of projects hosted by a LDC wish to delay the start date of the crediting period by more than two year but less than four years, the DOE shall validate the baseline scenario in accordance with chapter V, section E, subsection 5(d) above.				
	Comment:				

Protocol 2: Methodological Requirements (incl. tools)

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
3	Methodology AMS-II.C Demand-side energy efficiency activities for specific technologies				
3.1	Technology/measure				
3.1.1 [12] 1	This methodology comprises activities that encourage the adoption of energy-efficient equipment/appliance (e.g., lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems) at many sites. These technologies may replace existing equipment or be installed at new sites. In the case of new facilities, the determination of baseline scenario shall follow the procedures described in the general guidance to SSC methodologies under the section 'Type II and III Greenfield projects (new facilities).	6	DR	OK	OK
	Comment: The PoA is focused on the replacement of lighting equipment/appliance therefore the methodology is applicable.				
3.1.2 [12] 1	The aggregate energy savings by a single project may not exceed the equivalent of 60 GWh per year for electrical end use energy efficiency technologies. For fossil fuel end use energy efficient technologies, the limit is 180 GWh thermal per year in fuel input.	6	DR	OK	OK
	Comment: The DOE confirms that the aggregate energy savings by a CPA below the equivalent of 60 GWh per year for electrical end use energy efficient technologies.				
3.1.3 [12] 1	For each replaced appliance/equipment/system the rated capacity or output or level of service (e.g., light output, water output, room temperature and comfort, the rated output capacity of air-conditioners etc.) is not significantly smaller (maximum - 10%) than the baseline or significantly larger (maximum + 50%) ¹ than the baseline.	6,26	DR	OK	OK
	Comment: The level of service is comparable and in line with national legislation.				
3.1.4 [12] 1	If the energy efficient equipment contains refrigerants, then the refrigerant used in the project case shall be CFC free. Project emissions from the baseline refrigerant and/or project refrigerants shall be considered in accordance with the guidance of the Board (EB 34, paragraph 17). This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment/appliances.			N/A	N/A
	Comment: Not applicable				

¹ Project activities involving increase in output level compared to the baseline scenario are only eligible if they comply with the related and relevant guidance in the General Guidance for SSC methodologies which require a demonstration that the baseline scenario for the increased amount of output is the same as the baseline scenario defined by this methodology. Otherwise, in the event project output in year y is greater than the average historical output (average of three most recent years +/-10%) before the implementation of the project activity, the value of the output in year y is capped at the value of the historical average output level.

3.2	Boundary				
3.2.1	The project boundary is the physical, geographical location of each measure (each piece of equipment) installed.	6	DR	OK	OK
	Comment: Boundary is in line with the requirements of the methodology				
3.3	Baseline				
3.3.1 [12] 1	<p>If the energy displaced is fossil fuel based, the energy baseline is the existing level of fuel consumption or the amount of fuel that would be used by the technology that would have been implemented otherwise. The emissions baseline is the energy baseline multiplied by an emission factor for the fossil fuel displaced. Reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.</p> <p>If the energy displaced is electricity, the emission baseline is determined using one of the two following options:</p> <ul style="list-style-type: none"> Option 1: The product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced: $BE_y = E_{BL,y} * EF_{CO2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL}$ $E_{BL,y} = \sum_i (n_i * \rho_i * o_i) / (1 - l_y)$ <p>Where:</p> <p>BE_y Baseline emissions in year y (tCO2e)</p> <p>$E_{BL,y}$ Energy consumption in the baseline in year y (kWh)</p> <p>$EF_{CO2,ELEC,y}$ Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO2/MWh)</p> <p>Σ_i Sum over the group of "i" devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity</p> <p>n_i Number of devices of the group of "i" devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year</p> <p>ρ_i Power of the devices of the group of "i" baseline devices (e.g., 40W incandescent bulb, 5hp motor). In the case of a retrofit activity, "power" is the weighted average of the devices replaced. In the case of new installations, "power" is the weighted average of devices on the market</p> <p>o_i Average annual operating hours of the devices of the group of "i" baseline devices</p>	6	DR	OK	OK

Comment:					
	I_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable			
	$Q_{ref,BL}$	Average annual quantity of refrigerant used in the baseline to replace the refrigerant that has leaked (tonnes/year). Values from Chapter 7: Emissions of fluorinated substitutes for Ozone depleting substances, Volume 3, Industrial Processes and Product Use, 2006 IPCC Guidelines for National Greenhouse Gas Inventories may be used			
	$GWP_{ref,BL}$	Global Warming Potential of the baseline refrigerant (t CO ₂ e/t refrigerant)			
	<ul style="list-style-type: none"> Option 2: The specific energy consumption of the system in the baseline times the output in project year y times the emission factor for the electricity displaced. This option can only be used where comparable conditions for the output in the baseline and project can be established. For example in the specific case of a water pumping system comparable conditions can be established by one of the options below: 				

	<p>(i) Show that average baseline water flow rate (discharge) is within +/- 10% of the flow rate during the project;</p> <p>(ii) Choose the nameplate head and discharge specifications of the baseline pump and corresponding power/energy consumption (weighted average values can be used when pumps are operated in parallel) for a conservative estimate of EER</p> $BE_y = E_{BL,y} \times EF_{CO2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL}$ $E_{BL,y} = EER \times Q_y / (1 - I_y)$ <p>Where:</p> <p><i>EER</i> Specific Energy consumption in the baseline (MWh/unit). <i>EER</i> is calculated as total annual electricity consumed in the baseline divided by total quantity of annual output in the baseline. Data from at least 3 years prior to project implementation shall be used in the calculations, e.g., water supply from a pumping station (records of output can be used in lieu of actually monitored baseline data). For facilities that are less than 3 years old, all historical data shall be available (a minimum of one year data would be required)</p> <p><i>Q_y</i> Total quantity of supply in project year 'y' (unit)</p> <p><i>I_y</i> Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable</p>				
	<p>Comment: All baseline requirements - for greenfield and brownfield CPAs – are met.</p>				
3.3.2 [12] 4	<p>For project activities that seek to retrofit or modify an existing unit or equipment resulting in an increase in capacity, the determination of the baseline scenario for the incremental capacity shall be based on the procedures described in the general guidance to SSC methodologies under the sections 'retrofit' and 'capacity increase'.</p>	6	DR	OK	OK
	<p>Comment: Brownfields are replacements and Greenfields are new units therefore this is not applicable.</p>				

3.4	Project Activity Emissions				
3.4.1 [12]	<p>Project emissions consist of electricity and/or fossil fuel used in the project equipment, determined as follows.</p> $PE_y = EP_{PJ,y} * EF_{CO2,y}$ <p>Where:</p> <p>PE_y Project emissions in year y (tCO2e)</p> <p>$EP_{PJ,y}$ Energy consumption in project activity in year y. This shall be determined <i>ex post</i> based on monitored values</p> <p>$EF_{CO2,y}$ Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain</p> <p>Project energy consumption in case of project activities that displace grid electricity is determined as follows using the data of the project equipment or system:</p> $E_{PJ,y} = \sum_i (n_i * \rho_i * o_i) / (1 - l_y)$	6	DR	OK	OK
	<p>Comment: The project emissions are calculated according to the requirements.</p>				
3.4.2 [12]	<p>Project emissions from physical leakage of refrigerants are accounted for. All GHGs as defined per Article 1, paragraph 5 of the Convention shall be considered as per the guidance by the Board. $PE_{ref,y}$ is calculated as follows:</p> $PE_{ref,y} = (Q_{ref,PJ,y}) \times GWP_{ref,PJ}$ <p>Where:</p> <p>$PE_{ref,y}$ Project emissions from physical leakage of refrigerant from the project equipment in year y (t CO2e/y)</p> <p>$Q_{ref,PJ,y}$ Average annual quantity of refrigerant used in year y to replace refrigerant that has leaked in year y (tonnes/year). Values from Chapter 7: Emissions of fluorinated substitutes for Ozone depleting substances, Volume 3, Industrial Processes and Product Use, 2006 IPCC Guidelines for National Greenhouse Gas Inventories may be used</p> <p>$GWP_{ref,PJ}$ Global Warming Potential of the refrigerant that is used in the project equipment (t CO2e/t refrigerant)</p>	6	DR	OK	OK
	<p>Comment: Neither leakage nor refrigerant use occurs.</p>				
3.5	Leakage				

3.5.1 [12]	If the energy efficiency technology equipment is transferred from another activity, leakage is to be considered.	6	DR	OK	OK
	Comment: SQS confirms that the technology is not transferred from another technology (i.e. new lighting equipment is used exclusively)				
3.6	Monitoring				
3.6.1 [12]	<p>1. The emission reduction achieved by the project activity shall be determined as the difference between the baseline emissions and the project emissions and leakage.</p> $ER_y = (BE_y - PE_y) - LE_y$ <p>Where:</p> <p>ER_y Emission reductions in year y (tCO₂e)</p> <p>LE_y Leakage emissions in year y (tCO₂e)</p>	6	DR	OK	OK
	Comment: The ER is the difference between the baseline emissions and the project emissions and leakage				
3.6.2 [12]	<p>If the devices installed replace existing devices, the number and "power" of a representative sample of the replaced devices shall be recorded in a way to allow for a physical verification by DOE.</p> <p>Comment: CAR 10 was raised as The sampling procedure of "number" and "power" acc. para. 12 of AMS.II-C has not been included in the monitoring plan of the PoA DD, generic CPA-DD and specific CPA-DD.</p> <p>PoA documentation has been amended and therefore CAR10 is closed.</p>	6	DR	CAR 10	OK
3.6.3 [12]	<p>If the devices installed have a constant current (ampere) characteristics, monitoring shall consist of monitoring either the "power" and "operating hours" or the "energy use" of the devices installed using an appropriate method. Appropriate methods include:</p> <p>(a) Recording the "power" of the device installed (e.g., lamp or refrigerator) using nameplate data or bench tests of a sample of the units installed and metering a sample of the units installed for their operating hours using run time meters;</p> <p>OR</p> <p>(b) Metering the "energy use" of an appropriate sample of the devices installed.</p>	6	DR	OK	OK
	Comment: Monitoring is in line with the methodology.				
3.6.4 [12]	In either case, monitoring shall include annual checks of a sample of non-metered systems to ensure that they are still operating.	6	DR	OK	OK
	Comment: Monitoring is in line with the methodology.				

3.6.5 [12]	If the devices have variable current (ampere) characteristics, monitoring shall consist of metering the “energy use” of an appropriate sample of the devices installed. Monitoring shall also include annual checks of a sample of non-metered systems to ensure that they are still operating.	6	DR	OK	OK
	Comment: Monitoring is in line with the methodology.				
3.6.6 [12]	For pumping systems monitoring of project activity shall consist of metering the pumping energy use, hourly or daily discharge (m ³ per day or hour) and the total delivery head (m).	6	DR	OK	OK
	Comment: Monitoring is in line with the methodology.				
3.7	Project activity under a programme of activities				
3.7.1 [12]	The following conditions apply for use of this methodology in a project activity under a programme of activities: In case the project activity involves the replacement of equipment, and the leakage effect of the use of the replaced equipment in another activity is neglected, because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	6,12 ,23, 24	DR	OK	OK
	Comment: An independent monitoring of scrapping of replaced equipment is implemented (See CME Operational Manual procedures) and correspondence with ACTEBIS.				

Tool to calculate the emission factor for an electricity system

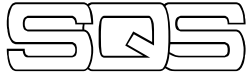
The AMS-ILC (Demand-side energy efficiency activities for specific technologies) methodology requires the use of the “Tool to calculate the emission factor for an electricity system” to determine the CO₂ emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the “Operating Margin” (OM) and “Build Margin” (BM) as well as the “Combined Margin” (CM).

CHECKLIST TOPIC / QUESTION	Ref.	MoV*	Draft Concl	Final Concl								
H. Tool to calculate the emission factor for an electricity system												
H.1. Justification of the choice of the tool and why it is applicable to the project activity												
H.1.1. Is the applied tool considered the most appropriate one?	6	DR	OK	OK								
Comment:	Yes, the tool is considered the most appropriate one.											
H.1.2. Criterion 1: Is the tool used for the purpose of calculating baseline emissions where a project activity supplies electricity to a grid?	6,11	DR	OK	OK								
<table border="1"> <thead> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Criterion discussed in the PDD?</td> <td>Y</td> </tr> <tr> <td>Compliance provable?</td> <td>Y</td> </tr> <tr> <td>Compliance verified?</td> <td>Y</td> </tr> </tbody> </table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Y	Compliance provable?	Y	Compliance verified?	Y				
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Y											
Compliance provable?	Y											
Compliance verified?	Y											
Comment:	The tool is used for the purpose of calculating baseline emissions where a project activity supplies electricity to a grid.											
H.1.3. Criterion 2: Is the tool used for the purpose of calculating baseline emissions for a project activity that results in savings of electricity that would have been provided by the grid?			N/A	N/A								
<table border="1"> <thead> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Criterion discussed in the PDD?</td> <td></td> </tr> <tr> <td>Compliance provable?</td> <td></td> </tr> <tr> <td>Compliance verified?</td> <td></td> </tr> </tbody> </table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?		Compliance provable?		Compliance verified?					
Applicability checklist	Yes / No											
Criterion discussed in the PDD?												
Compliance provable?												
Compliance verified?												
Comment:												
H.1.4. Criterion 3: Is the tool used for the purpose of calculating project and leakage emissions in case where a project activity consumes electricity from the grid or results in increase of consumption of electricity from the grid outside the project boundary?			N/A	N/A								
<table border="1"> <thead> <tr> <th>Applicability checklist</th> <th>Yes / No</th> </tr> </thead> <tbody> <tr> <td>Criterion discussed in the PDD?</td> <td>Y</td> </tr> <tr> <td>Compliance provable?</td> <td>Y</td> </tr> <tr> <td>Compliance verified?</td> <td>Y</td> </tr> </tbody> </table>	Applicability checklist	Yes / No	Criterion discussed in the PDD?	Y	Compliance provable?	Y	Compliance verified?	Y				
Applicability checklist	Yes / No											
Criterion discussed in the PDD?	Y											
Compliance provable?	Y											
Compliance verified?	Y											
Comment:												
H.2. Description of the parameters included in the tool												
Integrate the required amount of sub-checklists for parameters as given by the tool applied and comment on at least every line answered with “No”												
H.2.1. Parameter: EF _{grid,CM,y}	6,11	DR	OK	OK								

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl										
<p>Combined margin CO₂ emission factor for grid connected power generation in year y</p> <p>Unit: tCO₂/MWh</p> <p>Type: calculated</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Parameter discussed in the PDD?</td><td>Y</td></tr><tr><td>Inclusion / exclusion justified?</td><td>Y</td></tr><tr><td>Explanation / Justification sufficient?</td><td>Y</td></tr><tr><td>Consistency with monitoring plan?</td><td>Y</td></tr></table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	Y	Inclusion / exclusion justified?	Y	Explanation / Justification sufficient?	Y	Consistency with monitoring plan?	Y				
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	Y														
Inclusion / exclusion justified?	Y														
Explanation / Justification sufficient?	Y														
Consistency with monitoring plan?	Y														
Comment:	Combined margin CO ₂ emission factor for grid connected power generation in year y is calculated correctly.														
<p>H.2.2. Parameter: EF_{grid,BM,y}</p> <p>Build margin CO₂ emission factor for grid connected power generation in year y</p> <p>Unit: tCO₂/MWh</p> <p>Type: calculated</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Parameter discussed in the PDD?</td><td>Y</td></tr><tr><td>Inclusion / exclusion justified?</td><td>Y</td></tr><tr><td>Explanation / Justification sufficient?</td><td>Y</td></tr><tr><td>Consistency with monitoring plan?</td><td>Y</td></tr></table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	Y	Inclusion / exclusion justified?	Y	Explanation / Justification sufficient?	Y	Consistency with monitoring plan?	Y	6,11	DR	OK	OK
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	Y														
Inclusion / exclusion justified?	Y														
Explanation / Justification sufficient?	Y														
Consistency with monitoring plan?	Y														
Comment:	Build margin CO ₂ emission factor for grid connected power generation in year y is calculated correctly.														
<p>H.2.3. Parameter: EF_{grid,OM,y}</p> <p>Operating margin CO₂ emission factor for grid connected power generation in year y</p> <p>Unit: tCO₂/MWh</p> <p>Type: calculated</p> <table><tr><th>Boundary checklist</th><th>Yes / No</th></tr><tr><td>Parameter discussed in the PDD?</td><td>Y</td></tr><tr><td>Inclusion / exclusion justified?</td><td>Y</td></tr><tr><td>Explanation / Justification sufficient?</td><td>Y</td></tr><tr><td>Consistency with monitoring plan?</td><td>Y</td></tr></table>		Boundary checklist	Yes / No	Parameter discussed in the PDD?	Y	Inclusion / exclusion justified?	Y	Explanation / Justification sufficient?	Y	Consistency with monitoring plan?	Y	6,11	DR	OK	OK
Boundary checklist	Yes / No														
Parameter discussed in the PDD?	Y														
Inclusion / exclusion justified?	Y														
Explanation / Justification sufficient?	Y														
Consistency with monitoring plan?	Y														
Comment:	Operating margin CO ₂ emission factor for grid connected power generation in year y is calculated correctly.														
<p>H.2.4. Parameter: FC_{i,m,y}, FC_{i,y}, FC_{i,j,y}, FC_{i,k,y}, FC_{i,n,y} and FC_{i,n,h}</p> <p>Amount of fossil fuel type i consumed by power plant / unit m, j, k or n (or in the project electricity system in case of FC_{i,y}) in year y or hour h</p> <p>Unit: mass or volume unit</p> <p>Type: official publication</p>		6,11	DR	OK	OK										

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl
Boundary checklist	Yes / No				
Parameter discussed in the PDD?	Y				
Inclusion / exclusion justified?	Y				
Explanation / Justification sufficient?	Y				
Consistency with monitoring plan?	Y				
Comment:	Amount of fossil fuel type i consumed by power plant / unit m, j, k or n (or in the project electricity system in case of FCI,y) in year y or hour h is calculated correctly.				
H.2.6. Parameter: $EF_{CO_2,i,y}$ CO ₂ emission factor of fossil fuel type i in year y Unit: tCO ₂ /GJ Type:		6,11	DR	OK	OK
Boundary checklist	Yes / No				
Parameter discussed in the PDD?	Y				
Inclusion / exclusion justified?	Y				
Explanation / Justification sufficient?	Y				
Consistency with monitoring plan?	Y				
Comment:	CO ₂ emission factor of fossil fuel type i in year y is calculated correctly.				
H.2.7. Parameter: $EG_{m,y}$, EG_y , $EG_{j,y}$, $EG_{k,y}$ and $EG_{n,h}$ Net electricity generated and delivered to the grid by power plant / unit m, j, k or n (or in the project electricity system in case of EGY) in year y or hour h Unit: MWh Type: monitored		6,11	DR	OK	OK
Boundary checklist	Yes / No				
Parameter discussed in the PDD?	Y				
Inclusion / exclusion justified?	Y				
Explanation / Justification sufficient?	Y				
Consistency with monitoring plan?	Y				
Comment:	Net electricity generated and delivered to the grid by power plant / unit m, j, k or n (or in the project electricity system in case of EGY) in year y or hour h is calculated correctly.				
H.2.8. Parameter (only for dispatch data OM): $EG_{PJ,h}$ Electricity displaced by the project activity in hour h of year y Unit: MWh Type: monitored		6,11,	DR	OK	OK
Boundary checklist	Yes / No				
Parameter discussed in the PDD?	Y				
Inclusion / exclusion justified?	Y				
Explanation / Justification sufficient?	Y				
Consistency with monitoring plan?	Y				
Comment:	Electricity displaced by the project activity in hour h of year y is calculated correctly.				
H.2.9. Parameter: (only for dispatch data OM) $\eta_{m,y}$ Average net energy conversion efficiency of power unit m in year y Unit: - Type:		6,11	DR	OK	OK

CHECKLIST TOPIC / QUESTION		Ref.	MoV*	Draft Concl	Final Concl
Boundary checklist					
Parameter discussed in the PDD?	Yes / No				
Inclusion / exclusion justified?	Y				
Explanation / Justification sufficient?	Y				
Consistency with monitoring plan?	Y				
Comment: Average net energy conversion efficiency of power unit m in year y is calculated correctly.					
H.2.10. Do the spatial and technological boundaries as verified on-site comply with the discussion provided by / indication included to the PDD?		6,11	DR	OK	OK
Comment: The spatial and technological boundaries of the 1 st CPA as verified on-site comply with the first CPA-DD.					
H.3. Description of how the baseline methodology procedure is identified and description of the identified baseline procedure					
H.3.1. Is every selection of options offered by the tool correctly justified and is this justification in line with the situation verified on-site?		6,11	DR	OK	OK
Comment: Choice between the options offered by the tool are correctly justified.					
H.3.2. Are the formulae required for the determination of the Operating Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?		6,11	DR	OK	OK
Comment: All formulae required for the determination of the Operating Margin are correctly presented.					
H.3.3. Is the method to calculate the Operating Margin (Simple OM, Simple Adjusted OM, Dispatch data OM, or Average OM), the most appropriated one?		6,11	DR	OK	OK
Comment: The Simple OM has been selected and it is appropriate given the host country circumstances and data availability.					
H.3.4. Are the formulae required for the determination of the Build Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?		6,11	DR	OK	OK
Comment: The formulae required for the determination of the Build Margin are correctly presented.					
H.3.5. Is the set of power units (the set of five power units that have been built most recently, or the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently), comprising the larger annual generation?		6,11	DR	OK	OK
Comment: Capacity additions included in the Build Margin emission factor calculation are appropriately selected (the 5 plants have a cumulative capacity of 26.69%).					
H.3.6. Are the formulae required for the determination of the Combined Margin correctly presented, enabling a complete identification of parameter to be used and / or monitored?		6,11	DR	OK	OK
Comment: The formulae required for the determination of the Combined Margin are correctly presented.					
H.3.7. Are the values used for w_{OM} and w_{BM} correctly applied?		6,11	DR	OK	OK
Comment: The values used for w_{OM} and w_{BM} are correctly applied.					
H.3.8. Is the calculation of the operating margin and build margin emission factors documented electronically in a spreadsheet attached to the CDM-PDD. This should include all data used to calculate the emission factors		6,11	DR	OK	OK
Comment: The calculation of the Operating Margin and Build Margin emission factors are documented electronically in a spreadsheet [7].					
H.3.9. Are the default efficiency factors for power plants used according to Annex		6,11	DR	OK	OK



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CHECKLIST TOPIC / QUESTION	Ref.	MoV*	Draft Concl	Final Concl
I of the tool?				
Comment:	The default efficiency factors for power plants are used according to Annex I of the tool.			

Protocol 3: Project Specific Requirements

There are no project specific requirements beyond those already covered by Protocol 1 and Protocol 2. In case of PoA validations, the requirements of the PoA Standard (EB 65 Annex 3) are addressed directly in the Validation Report.

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
4	Project specific requirements				
4.1					
4.1.1					
	Comment:				
4.1.2					
	Comment:				
4.1.3					
	Comment:				
4.2					
4.2.1					
	Comment:				
4.2.2					
	Comment:				
4.2.3					
	Comment:				
4.3					
4.3.1					
	Comment:				
4.3.2					
	Comment:				
4.3.3					

Protocol 4: Summary of Requests*

*Referring both to PoA-DD and the CPA documentation.

No.:	CL 1	Reference: A.2
Validator request:	Further elaboration is needed on how the LED's kick-off activity relates to South Africa's Redistribution and Development Programme's housing projects (p.2.). Same applies to the Department of Science and Technology Cooperation (p.4) If no official agreements have been reached yet about the inclusion of the LED's kick-off in official policies and measures this needs to be clearly indicated in the PDD.	
Project participant response:	As the cooperation with the Department of Science and Technology and South Africa's Redistribution and Development Programme's housing projects did not officially materialise these references have been deleted.	
Validator conclusion:	PoA-DD has been amended therefore CL1 is closed.	Date: 22/12/2010

No.:	CL 2	Reference: A.2; A.4.3
Validator request:	Clarification of the meaning of the abbreviations used in the text such as BBBEE ("black enterprise") and SMME ("small and medium enterprise") or NERSA, DME and Eskom are needed.	
Project participant response:	All abbreviations have now been written in full.	
Validator conclusion:	PoA-DD has been amended therefore CL2 is closed.	Date: 22/12/2010

No.:	CL 3	Reference: A.3.
Validator request:	The documentation does not reflect the role of Pharox Lumens Africa in line with the latest developments.	
Project participant response:	The role of Pharox Lumens Africa was reconsidered by Lemnis, therefore we have deleted the reference to this organisation as main distributor.	
Validator conclusion:	Closing CL12 implies that CL3 conclusion remains valid. PoA-DD has been amended therefore CL3 is closed.	Date: 09/05/2011

No.:	CL 4	Reference: A.3.
Validator request:	Description of the role of the Department of Environment of South Africa with respect to the retiring of CERs related to the 2010 football World Cup is unclear.	
Project participant response:	It has been added that the LED's Kick-off programme is endorsed by the Ministry of Environmental Affairs to offset the domestic footprint of the 2010 World Cup over a 10 year period.	

Validator conclusion:	PoA-DD has been amended therefore CL4 is closed.	Date:	22/12/2010
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No.:	CL 5	Reference:	A.4.1.1
Validator request:	"Government of South Africa" is used instead of the "Republic of South Africa".		
Project participant response:	The official 'Republic of South Africa' is now used.		
Validator conclusion:	PoA-DD has been amended therefore CL5 is closed.	Date:	22/12/2010

No.:	CL 6	Reference:	A.4.3.
Validator request:	<p>The Barrier analysis does not demonstrate that the barriers are not only substantial but they are also preventive. Table 2 and it supportive text has to be substantiated further to reflect most specifically the "access to finance" barrier and the lack/existence of "different incentive mechanisms". Subsequently the explanation why Investment Analysis step is not used according to the Additionality Tool needs to be provided.</p> <p>Further elaboration is needed regarding the autonomous replacement of incandescent bulbs with CFLs in the Common practice analysis section.</p>		
Project participant response:	<p>The argumentation in the barrier analysis was rewritten explaining the preventive character. In the scenario 3 the different most likely financial mechanisms have been mentioned explicitly:</p> <ol style="list-style-type: none"> 1. Financial lease 2. Energy service company 3. Subsidies <p>Expert opinions supporting the argumentation will be submitted shortly.</p> <p>The explanation why the Investment Analysis is not applicable has been added. In the common practise analysis the 'business as usual' scenario is now defined as: replacement with the most conservative common practice (currently CFLs)</p>		
Validator conclusion:	The expert statement confirming the validation on-site visit meeting statements regarding preventive financing barriers for energy efficiency investments were sent by Deloitte to PP on 4 January 2011. Additionality and common practice sections have been extended therefore CL6 is closed.	Date:	15/02/2011

No.:	CL 7	Reference:	general
Validator request:	Table numbering of the documentation due to MS Office automatic formatting is		

	mistaken; some the tables has different numbers than quoted in the respective text and Table numbering from Section E is mistaken.	
Project participant response:	Table numbering and cross-references have been checked and updated.	
Validator conclusion:	PoA-DD has been amended therefore CL7 is closed.	Date: 22/12/2010

No.:	CL 8	Reference: E.6.2.
Validator request:	Not the same rounded figures for $EF_{grid,CM,y}$ are used in the text (p32 and p35 respectively)	
Project participant response:	The same rounded value of 1.02 is used throughout the PoA-DD.	
Validator conclusion:	PoA-DD has been amended therefore CL8 is closed.	Date: 22/12/2010

No.:	CL 9	Reference: E.6.3.
Validator request:	The explanation for expected failure rate ($r_{failure}$) of LED equipment distributed is seemingly insufficient; reflecting the fact that no historic evidence exist for long term failure rates as LEDs have not been long enough on the market is missing .	
Project participant response:	Tests have shown that the lifetime of LEDs is 35,000 burning hours. To be conservative the failure rate has been raised from 0.5% to 1%. Calculations of final emission reductions will be based on the monitored failure rate.	
Validator conclusion:	As ERs will be calculated based on monitored (actual) failure rates, CL9 is closed.	Date: 22/12/2010

No.:	CL 10	Reference: E.7.1.
Validator request:	Explanation how “new” (greenfield) and “replaced” equipment will be differentiated is not sufficient. Parameters such as n_i and n_{nk} would allow the calculations of the proportions and the exact amount of “new” and “replaced” equipment, but further elaboration of tracking “new” and “replaced” equipment is needed.	
Project participant response:	It is possible to differentiate between ‘greenfield’ or ‘replaced’ in the monitoring database as the installer will make note of this. This is described in section E.6.3. The parameters n_i however have not been altered. (We do not think the reference to n_{nk} is relevant).	
Validator conclusion:	Section E.6.3 explanations are sufficient, therefore CL10 is closed.	Date: 22/12/2010

No.:	CL 11	Reference: Annex 2
Validator request:	A written statement by Lemnis Lighting B.V. that no public funding is used for the implementation of the project is missing.	
Project participant	This written statement has been submitted.	

response:

Validator conclusion:	Lemnis Lighting B.V. statement has been received; CL11 is closed.	Date:	09/05/2011
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No.:	CL 12	Reference:	South African DNA's request (dated 2011 03 31)
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Validator request:	<p>Please provide us a copy of the Distribution Agreement dated 26 May 2010 between Lemnis and PLA and any available documents that show the subsequent redefinition of their commercial legal relationship.</p> <p>The South African DNA has asked SQS to further investigate the ownership of / title to CERs by Lemnis Lighting BV as the domestic stakeholder consultation process for the LoA resulted in one submission questioning the ownership of CERs.</p>
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Project participant response:	<p>The duly signed Sales and Distribution Agreement is provided herewith. Please also refer to the e-mail string between the Project Participant and Pharox Lumens Africa which is also provided herewith.</p> <p>The Project Participant is the unambiguous owner of the CERs potentially to be generated by the PoA as provided for in the contractual underpinnings of the PoA and as explained in the Project Participant's memorandum to the DOE, which memorandum is entitled: "Lemnis_memo_SQS_final_030511_clean.doc. Please refer to paragraph 9(e) of Annexure "A" to the cover letter, which cover letter and Annexure "A", together, comprise the memorandum.</p>
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Validator conclusion:	<p>Based on the information obtained, SQS has not found any indication that Lemnis Lighting B.V. is not the rightful and only owner of the potentially generated CERs of the proposed CDM PoA. The analysis of the Validator obtained documentary evidence describing the entire history of the commercial relationships between Pharox Lumens Africa (Rivamart Ltd), Nwando Investment, Team Holland and Lemnis Lighting B.V has resulted in confirming an unambiguous and fully transparent CER ownership structure. Moreover, it is important to note that during the entire commercial</p>	Date:	09/07/2012
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relationship the obligations and benefits associated with CERs have been unambiguously and transparently defined.
The South African DNA issued its LoA after investigating the Pharo Lumens Africa claims. Therefore CL12 is closed.

No.:	CL 13	Reference: A.4.3; E.4
Validator request:	<p>The three scenarios identified and analysed:</p> <ol style="list-style-type: none"> 1. Business as usual 2. Same programme without use of CDM, with use of a different incentive mechanism 3. Programme achieving the same results with different technology without use of CDM, with use of a different incentive mechanism <p>Are split into four scenarios (No 2 scenario. being split into two parts) in Section A.4.3.</p>	
Project participant response:	<p>The previous scenarios 2 and 3 are merged and numbering of scenarios is adjusted. Three mutually exclusive scenarios are presented.</p>	
Validator conclusion:	PoA documentation, including CME Operational Manual, have been amended therefore CL 13 is closed.	Date: 21/08/2012

No.:	CL 14	Reference: CME Operational Manual
Validator request:	<p>“Annexure 1: Confirmation to PoA stated CPA Eligibility Criteria” does not contain all the 17 eligibility criteria defined in the PoA documentation.</p>	
Project participant response:	<p>In the CME operational manual the Annexure 1: Confirmation to PoA stated CPA Eligibility Criteria is adjusted. It now reflects all eligibility 17 criteria and is in line with the PoA and generic CPA documentation.</p>	
Validator conclusion:	CME Operational Manual has been amended therefore CL 14 is closed.	Date: 21/08/2012

No.:	CAR 1	Reference: general
Validator request:	<p>The first specific CPA document has to be submitted in order to be able to upload the „LED's kick-off“ project documentation for Global Stakeholder Commenting at the UNFCCC website. SQS understands that negotiations are under way with the entities where LEDs will be installed and that will become part of the first specific CPA. As soon as project progress allows, please update/submit the specific CPA allowing to start the Global Stakeholder Commenting period.</p> <p>CPA0001 'Mining retrofit' requires updating to reflect the development between initial submission in December 2010 and the Host Country LoA issuance on 22 February 2012.</p>	
Project participant response:	The specific SSC-CPA –DD of CPA0001 'Mining retrofit' is submitted.	
Validator conclusion:	The specific SSC-CPA–DD has been updated therefore CAR1 is closed.	Date: 10/05/2012

No.:	CAR 2	Reference: general
Validator request:	<p>The LoAs from Host and Annex I party have to be obtained and submitted to SQS. Host Country LoA does not contain the CME authorisation. Lemnis shall request that DNA to write a supplementary letter referring to the LoA and confirming that the authorisation extends to the CME function.</p>	
Project participant response:	Indeed the Letter of Approval from the South African DNA dated 22/2/2012 was received by Lemnis Lighting B.V. also authorising Lemnis to be the CME.	
Validator conclusion:	LoAs have been issued (on 22/02/2012 by Host country and on 05/04/2011 by Annex I country); Host Country LoA includes the CME authorisation therefore CAR 2 is closed.	Date: 10/05/2012

No.:	CAR 3	Reference: A.4.4.2
Validator request:	<p>Due to the non-homogenous nature of the installations (i.e. the potential different use of the products within the same/various user profiles) and the fact that a balanced CPA level sampling has to be guaranteed please revise the PoA level stratified random sampling approach and include additional random samples on the CPA level. An addition of 96 monitored items in each CPA will guarantee that the PoA level monitoring will be adequate and statistically representative. Please elaborate how these additional elements will be selected within the product (or user) groups of each CPA.</p> <p>The sampling method is not aligned with EB 65 Annex 2 but of the expired EB 50 Annex 30.</p>	
Project participant	The monitoring is adjusted and now fully in line with EB 65 Annex 2. The sampling is	

response:	brought to the CPA level with four sampling groups per CPA (strata): high power/ low power, indoor/ outdoor. The minimum desired precision of the sample groups is a sampling error of 10% and a confidence level of 95%.	
Validator conclusion:	The proposed sampling modification fulfils the sampling requirements for the PoA and its CPAs. The sampling method has been fully aligned with EB 65 Annex 2. CAR 3 is closed.	Date: 10/05/2012

No.:	CAR 4	Reference: A.4.4.2
Validator request:	The description is missing on how a sample of “non-metered systems” will be monitored according to paragraph 14 of the “Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories”. The sampling method is not aligned with EB 65 Annex 2 but of the expired EB 50 Annex 30.	
Project participant response:	The monitoring is adjusted and now fully in line with EB 65 Annex 2. Lamp failure rate is determined by means of non-metered sampling groups per CPA. The sample groups will be identified by the monitoring actor on the basis of random sampling. The operating hours are corrected by the percentage of LEDs replaced ($r_{failure,k,y}$) times the down time (per stratum) for each type of LED lighting equipment ($of_{k,y}$). The minimum desired precision of the sample groups is a sampling error of 10% and a confidence level of 95%.	
Validator conclusion:	The sampling method has been aligned with EB 65 Annex 2 therefore CAR 4 is closed.	Date: 10/05/2012

No.:	CAR 5	Reference: D.2.;D.3.;D.4
Validator request:	Local stakeholder consultation details are insufficiently described.	
Project participant response:	Local stakeholder consultation took place on January 27th, 2011 in Freedom Park, Pretoria, South Africa. Invitees were from a broad range of stakeholders. In total, 19 stakeholders were present. No negative comments were received from the stakeholders. The few queries raised were answered in a satisfactory manner by the project promoter, see the summary below. Section D.2, D.3 and D.4 elaborated accordingly.	
Validator conclusion:	PoA documentation has been updated therefore CAR 5 is closed	Date: 10/05/2012

No.:	CAR 6	Reference: Entire documentation
Validator request:	The PoA DD, generic CPA-DD and 1 st CPA DD need to reflect <i>actual progress/changes</i> occurred during the 14 months since requesting the LoA of the Host Country. This updating shall include the grid emission factor for which both the methodology and the available historical electricity date have changed.	
Project participant response:	The PoA DD, generic CPA-DD and 1 st CPA DD now reflect all <i>actual progress/changes</i> occurred during the last 14 months. This includes an update of the grid emission factor and the eligibility criteria (see also CAR 7).	
Validator conclusion:	PoA documentation has been updated therefore CAR 6 is closed.	Date: 10/05/2012

No.:	CAR 7	Reference: Entire documentation
Validator request:	The PoA DD, generic CPA-DD and 1 st CPA DD need to reflect <i>UNFCCC standard and tool changes</i> occurred during the 14 months since requesting the LoA of the Host Country. This updating shall address EB 65 PoA Standard (Annex 3), Sampling and Survey standard (Annex 2) and other applicable PoA related decisions (e.g. EB 63 Annex 23, EB 63 Annex 24) Prevailing practice/technological barrier analysis proves that the penetration of the LED technology is low/insignificant and therefore a/the CPA can be additional. This is in line with the applicable SSC guidance (EB35, Annex 34: Non-binding best practice examples to demonstrate additionality for SSC project activities and EB50, Annex 13). The PoA DD lacks the quantification of a market penetration threshold above which the prevailing practice/technology barrier no longer applies to CPAs.	
Project participant response:	A market penetration threshold 33% was introduced to quantify the prevailing practice/technology barrier. Meaning that as long as the market penetration does not reach 33%, LEDs are not regarded common practice. Thus when the threshold is not met, LED technology is still innovative (see section A.4.3). The threshold of market penetration is included in the eligibility criteria for CPA inclusion, meaning that for each CPA it has to be proven that market penetration is below 33% in order to be included (see section A.4.2.2). For each CPA this is to be demonstrated: a) Publicly available regional or national statistics or b) Alternatively (if a) is not available) the opinion/statement from at least one independent expert	
Validator conclusion:	PoA has been amended to reflect an applicable threshold therefore CAR 7 is closed. .	Date: 09/07/2012

No.:	CAR 8	Reference: A. 4.2.2
Validator request:	Details regarding the structure of the operational, management and quality assurance arrangements established by the coordinating/managing entity (CME) for	

	the implementation of the PoA are insufficient. These details can be provided in a form of a standalone document (Manual, Standard Operation Procedures etc) to be used by the responsible CME personnel guaranteeing that CME satisfies the requirements of EB 65 Annex 3 para 17 and other respective PoA requirements for management and quality systems.	
Project participant response:	The CME operational procedures are now recorded in the separate CME manual according to EB 65 Annex 3 - Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities (version 01.0)	
Validator conclusion:	PoA documentation, including the CME Manual, has been updated therefore CAR 8 is closed.	Date: 09/07/2012

No.:	CAR 9	Reference: PoA documentation; Combined Tool
Validator request:	<p>Within SSC projects the barrier analysis approach can be carried out by different ways including the techniques that resemble the elements of the Combined Tool. The SSC guidelines referred in para 7 of the "General guidelines to SSC CDM methodologies", namely EB 35 Annex 34 and EB 50 Annex 13 do not provide guidance on how to conduct the Barrier analysis neither the Tools for conducting the Barrier analysis. Therefore the elements of the Combined Tool have been regularly used by registered SSC projects to substantiate that the prevailing/common practice & technology barrier is the decisive additionality factor.</p> <p>However, as the SSC methodologies do NOT require the compulsory use of the Combined Tool therefore the PoA DD wording is ambiguous in its references to the Combined Tool.</p>	
Project participant response:	<p>The reference to the Combined Tool was adjusted in the PoA-DD (see section A.4.3). It is clarified that additionality is demonstrated using the criteria outlined in Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities. Furthermore it is clarified that elements of combined tool are borrowed to ensure a well-developed discussion of additionality and substantiate the analysis.</p> <p>It is noted that, as the project is small-scale and pertaining methodology AMS-II.C (version 13), the programme is not obliged to apply the 'Combined tool to identify the baseline scenario and demonstrate additionality' (Version 04.0.0). Elements of the Combined Tool are borrowed as best practice to complement the additionality analysis.</p> <p>Furthermore all guidance applicable during the additionality demonstration is now clearly listed in section A.4.3.</p>	
Validator conclusion:	PoA documentation has been amended therefore CAR 9 is closed.	Date: 09/07/2012

No.:	CAR 10	Reference: PoA-DD (E.7.1) and CPA-DDs (B.6.1)
Validator request:	<p>The sampling procedure of "number" and "power" acc. para. 12 of AMS.II-C has not been included in the monitoring plan of the PoA DD, generic CPA-DD and specific CPA-DD. Further, a cross-reference to this requirement is missing in the description of the corresponding parameters to be monitored in both, PoA-DD (E.7.1) and CPA-DDs (B.6.1).</p> <p>Correct failure rate source (Survey of non-metered sampling) is included in the Monitoring Plan (A.4.4.2.) however in E.7 of PoA-DD and B.6.1 of the CPA it is incorrectly described (Periodic readings of monitoring equipment.)</p>	
Project participant response:	<p>The sampling requirements of §12 AMS-II.C were incorporated in the monitoring plan of the PDDs (v04) (see section A.4.4.2 PoA-DD and B.6.1 CPA-DDs). The respective sampling procedure was defined as follows: The number and "power" of the replaced equipment to be recorded for physical verification is based on the identified samples within the metered sampling survey ($S_{\text{metered},k}$). That means, if a meter is installed the replaced lamp is collected and stored for verification.</p> <p>A reference was furthermore added to section E.7.1 of the PoA-DD and section B.6.1 of the CPA-DDs (see parameter boxes for n_i and p_i).</p> <p>Further adjustments were made to parameter boxes of r_{failure} rate to reflect the periodic non-metered sampling survey(s).</p>	
Validator conclusion:	PoA documentation has been amended therefore CAR 10 is closed.	Date: 21/08/2012

No.:	CAR 11	Reference: E.6.2, E.6.3 CPA: B.5.1
Validator request:	The PoA DD, generic CPA-DD and 1 st CPA DD are not unambiguous regarding the updating requirements with respect to the grid emission factor value (i.e. the calculated value is fixed for the PoA lifetime or for the crediting period of CPA-00 / each CPA).	
Project participant response:	The PoA DD, generic CPA-DD and 1 st CPA DD describe the treatment of the grid factor at CPA inclusion and crediting period renewal.	
Validator conclusion:	PoA documentation has been amended therefore CAR 11 is closed.	Date: 01/12/2012

No.:	CAR12	Reference: A.4.4.2, Annex 4 CPA:B.6.1;Annex 4
Validator request:	The PoA DD, generic CPA-DD and 1 st CPA DD are not sufficiently detailed with respect to sampling procedures. The amendments need to be aligned with latest applicable sampling standard and guidelines (EB 69 Annex 4&5)	
Project participant response:	The PoA DD, generic CPA-DD and 1 st CPA DD has been amended and updated to EB 69 Annex 4& 5	
Validator conclusion:	PoA documentation has been amended and updated therefore CAR 12 is closed.	Date: 01/12/2012

No.:	FAR 1	Reference: CPA/001
Validator request:	<p>Signed CPA-001 owner statements for CPA-001 compliance with eligibility criteria N° 3, N° 10, N° 12, N° 16 have to be presented at Verification.</p> <p>As the testing of the LED luminaries is still under way by the CPA-001 owner at the time of finishing the validation process not all CPA-001 owner statements are available for the validating DOE for checking.</p>	
Project participant response:	<p>The CPA Eligibility Check Report certifies compliance with all eligibility criteria. The template of the Eligibility Check Report is given in the CME operational manual. The Eligibility Check Report is signed by for each CPA by it respective owner. All Eligibility Check reports are archived by the CME.</p> <p>Signed records from CPA owners to comply with eligibility criteria No 3, 10, 12 and 16 are thus guaranteed.</p>	
Validator conclusion:	<p>The written statements for CPA-001 for eligibility criteria No 3, 10, 12 and 16 shall be checked at the time of the first periodic verification of CPA-001.</p>	<p>Date: 21/08/2012</p>