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CDM PoA/CPA Validation Report

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1 Introduction

1.1 Objective

Mabanaft Carbon B.V.has retained SQS to validate the "LED's save energy" 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
- Decisions and specific guidance issued by the CDM EB published under http://cdm.unfccc.int
- The Clean Development Mechanism Validation and Verification Manual (version 1.2)
- Glossary of CDM terms (version 06)
- Eligibility of activities under the CDM (EB 33, para. 30)
- 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)
- AMS-II.C. Demand-side energy efficiency activities for specific technologies (version 13)
- Tool to calculate the emission factor for an electricity system (version 02.2.1)
- Guidance on Programme of Activities (PoA) (EB 35, para. 15)
- General Guidelines to SSC CDM methodologies (version 17)
- Guidelines on the demonstration of additionality of small-scale project activities version 9 (EB 68 Annex 27) previously known as Attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities
- Guidelines on Assessment of Debundling for SSC Project Activities (EB 54, Annex 13)
- 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)
- Standard for sampling and surveys for CDM project activities and programme of activities (version 02.0,EB 69, Annex 4)

- Standard for sampling and surveys for CDM project activities and programme of activities (version 3.0, EB 69, Annex 4)
- Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0, EB 69, Annex 5)
- General guidelines for sampling and surveys for small-scale CDM project activity (EB 50, Annex 30)
- Guidelines for objective demonstration and assessment of barriers (EB 50, Annex 13)
- Implementation plan for standards for programme of activities (version 01.0, EB 64, Annex 2)
- Non-binding best practice examples to demonstrate additionality for SSC project activities (EB 35, Annex 34)

The validation team has used a risk-based approach focusing on the identification of significant risks for project implementation and the generation of CERs. 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 judgment in accordance with the importance of the task performed.

1.3 Project description

PoA
The programme aims at creating a marketing platform for supporting the usage increase 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 India.

CPA-001
The first CPA under the PoA will target Indian Oiltanking (IOT) sites, located all over India. The project participants have convinced IOT to participate under the CPA-001 and install LED lighting equipment. IOT end-users can 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 to generate the electricity. The CPA is sized according to the estimated savings for the pilot IOT site multiplied by the number of sites owned, managed, operated or built by IOT. Thus CPA-001 is expected to reduce 62 578 tons of CO_2e over the selected ten year fixed crediting period.

1.4 Validation methodology

The SQS auditors apply standard auditing techniques to assess the correctness of the information provided by the project participants, including, where appropriate, but not limited to:
(a) Document review, involving: review of data and information to verify the correctness, credibility and interpretation of presented information and cross checks between information provided in the PDD and information from sources other than that used, if available, and if necessary independent background investiga-

tions.

(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.

If, during the validation of a project activity, the auditor identifies issues that need to be further elaborated upon, researched or added to in order to confirm that the project activity meets the CDM requirements and can achieve credible emission reductions, the auditor shall ensure that these issues are correctly identified, discussed and concluded in the validation report.

The auditor shall raise a corrective action request (CAR) if one of the following occurs:

(a) The project participants 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;

(c) There is a risk that emission reductions cannot be monitored or calculated.

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

The auditor 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.

The auditor shall resolve or "close out" CARs and CLs only if the project participants modify the project design, rectify the PDD or provide adequate additional explanations or evidence that satisfies the SQS' concerns. If this is not done, the SQS shall not recommend the project activity for registration to the CDM Executive Board.

In order to ensure transparency, a validation protocol (CDM PoA/CPA Validation Protocol) was customized for the project. The protocol shows, in a transparent manner, criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation;
- The validation protocol consists of several tables. The different columns in these tables are described in below figure;

The completed validation protocol is enclosed in Appendix F to this report.

CDM Validation Protocol 1 - 3: Requirements	
Requirement	The requirements the project must meet.
Ref.	Reference to the PDD or documents.
MoV *(Means of Validation)*	Explains how conformance with the requirements is investigated. DR = Document Review, I = Interview, N/A = Not Applicable
Comment	The section is used to elaborate and discuss the conformance to the requirement.
Draft Concl. / Final Concl. *(Draft and/or Final Conclusion)*	OK = Conform, CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

CDM Validation Protocol 4: Summary of Requests	
No.	The requests (CAR, CL, FAR) are numbered and listed in this section.
Ref.	Reference to the requirement number in Protocol 1 - 3 where the request is explained.
Validator request	The section is used to elaborate and discuss the request. The auditor may give reference to the PDD or documents.
Project participant response	The responses given by the client or other project participants during the communications with the validation team is summarised in this section.
Validator conclusion	This section summarises the validation team's responses and final conclusions. The conclusions are also included in Protocol 1 - 3, under "Final Conclusion".
Date	Date when request was closed.

2 Validation Opinion

2.1 Summary of the validation conclusions

Based on

- PoA-DD, generic CPA-DD and CPA-001-DD version 5.3 dated 17/10/2012 [89-91]
- 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)
- Guidelines on the demonstration of additionality of small-scale project activities (EB 68, Annex 27)
- 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)
- General guidelines for sampling and surveys for small-scale CDM project activity (EB 50, Annex 30)
- 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

it is SQS' opinion, that the small-scale programme of activity "LED's save energy" described in the CDM-SSC-PoA-DD, generic CDM-SSC-CPA-DD and specific CDM-SSC-CPA-DD (CPA-001) 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 and supported by the submitted documents. Furthermore, the approved methodology is correctly applied 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.
This has included:

- A desk review of the POA-DD, generic CPA-DD and CPA-DD of CPA-001 including the annexes and additional documents not limited to those provided by the project participants. All reviewed documents are listed in Appendix C,
- Two on-site visits between 25-27 July, 2011 and 19-20 December, 2011 including interviews. The detailed on-site visit programme is in Appendix A; the full list of interviews is in Appendix B.
- Follow up interviews with project participants

21 CARs, 19 CLs and 0 FARs have been raised; of these all 21 CARs and 19 CLs are closed. As a consequence of these requests the CDM-SSC-PoA-DD has been modified from the original version 2.1 (19/12/2011) to the current version 5.3 (17/10/2012) , the generic CDM-SSC-CPA-DD has been modified from the original version 2.0 (10/09/2011) to the current version 5.3 (17/10/2012) and the specific CDM-SSC-CPA-DD has been modified from the original version 2.0 (10/09/2011) to the current version 5.3 (17/10/2012).

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 6 258 tCO_2 per year and 62 578tCO_2 for the fixed crediting period of 10 years from 01/12/2012 to 30/11/2022 is correctly, accurately and conservatively calculated for 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 SQS, that 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 Approval

Receipt of LoA
CAR 9 was raised: PP shall provide the appropriate letters of approval and CME authorization from the host party. After having received the LoAs the CAR has been closed.

LoA host party India, Reference Ministery's letter N° 4/10/2012-CCC of the Mininstry of Environment and Forests, Government of India, dated 12 October, 2012 has been received [83]. The LoA is issued by the National CDM Authority, the DNA of the host party.

LoA of the Netherlands [82], Reference 2011ANL506 signed 15/09/2011 has been received. The LoA authorizes the participation of Mabanaft Carbon B.V. as Project Participant.

LoA of the Netherlands [84], Reference 2012ANL648 signed 18/07/2012 has been received. The LoA authorizes the participation of Do-Inc. Business B.V. as Project Participant.

They indicate the participation of each project participant has been approved by a party to the Kyoto Protocol. No entities other than those approved as project participants are included in the PDD.

LoA source
The LoAs were received from the project participants.

Authenticity
SQS has tried to cross-check authenticity by checking the host country website (http://www.cdmindia.gov.in/reports_new.php?n=1) and calling the DNA. Given the overload of large volumes of LoAs pending, the website was last updated mid–September 2012 and it was not possible to get access by phone. Based on experience and local knowledge, SQS regards the LoA as authentic.

The authenticity of the LoAs issued by the Netherlands [82,84] was confirmed by searching the online available project database [85] and identifying the specific project by title as one that has received the LoAs.

Statements
LoA host party [83] dated 12/10/2012 include clear statements that:

a. The Government of India has ratified the Kyoto Protocol in August 2002

b. Participation in the proposed CDM Programme of Activities is voluntary;

c. the proposed CDM Programme of Activities contribute to the sustainable development of India;

d. It refers to the precise proposed CDM programme activity title "LED's save Energy" in the PoA-DD.

It must be noted that the LoA from the Government of India contains a list of additional conditions. These conditions refer to the following:
- The Managing/Coordinating Entity as well as individual proponent of CDM Programme Activities (CPAs) shall not sell the CERs to any agency/ company/ organization which purchases CERs using ODA Funds;
- The Managing/Coordinating Entity as well as individual proponent of CDM Programme Activities (CPAs) shall furnish expeditiously any information, during the lifetime of the project as requested by the National

CDM Authority;
- The Managing/Coordinating Entity as well as individual proponent of CDM Programme Activities (CPAs) shall obtain all statutory clearances and other approvals as required from the competent authorities for setting up the project;
- All activities relating to the CDM project activity shall comply with the decisions taken by COP/MOP to the UNFCCC and CDM Executive Board;
- The Managing/Coordinating Entity shall ensure that all CDM Programme Activities (CPAs) are duly registered/incorporated by Indian authorities prior to their joining the PoA;
- The approval is not transferable. The DNA reserves the right to revoke the Host Country Approval if the conditions stipulated in this approval are not complied with to the full satisfaction of the National CDM Authority.

SQS validated that these additional conditions, introduced by the National CDM Authority of India, do not compromise VVM Article 45-46 requirements. Therefore, the LoA of the host party is unconditional with respect to (a) to (d) above. The LoA does not specify the PoA-DD version number.

The LoAs other party [82] signed 15/09/2011 and [84] signed 18/07/2012 include clear statements that:

a. the State of the Netherlands ratified the Kyoto Protocol on 31 May, 2002;

b. Participation is voluntary;

c. It refers to the precise proposed Programme of Activity "LED's save Energy" in the PoA-DD

The LoA is unconditional with respect to (a) to (c) above.

SQS confirms that the Letters of Approval have been issued by the respective party's designated national authority (DNA) and are valid for the proposed CDM Programme of Activities under validation. The LoA's meet the criteria listed in VVM v.1.2 para 45-46.

3.2 Participation

The Coordinating or managing entity (hereafter CME) of the PoA and the project participants are listed in tabular form in Section A.3 of the CDM-SSC-PoA-DD. This has been validated against the contact details provided in Annex 1 of the CDM-SSC-PoA-DD and the LoAs provided for both parties.
No entities other than those approved as project participants are included in these sections of the CDM-PoA-DD.

Coordinating/managing entity and participants of POA
CL 17 was raised: Table A.3 of the PoA DD (page 5) does not contain any indication of the CME. As listed in Table A.3 of the revised PoA-DD the programme's Coordinating or Managing Entity (CME) is Mabanaft Carbon India Pvt. Ltd., based in Mumbai, India. Mabanaft Carbon India Pvt. Ltd is referred to as the Coordinating and Managing Entity for the PoA by the host country DNA, which is party to the Kyoto Protocol [83].

Participants in the programme of activity
Participation of Mabanaft Carbon B.V. has been approved by a written approval of The Netherlands [82] which is party to the Kyoto Protocol.
Do-inc. business B.V. is responsible for the development of the documentation of the PoA on behalf of the CME. Participation has been approved by a written approval of The Netherlands [84] which is party to the Kyoto Protocol.
A clear and transparent description of the operational and management arrangements have been established

and stated in the PoA-DD. There is a record and documentation keeping system for each CPA under the PoA, and has been checked during the on-site visit by SQS along with the established records and documentation control process. The CME has established an operational manual [92] which contains all procedures, templates and responsibilities to control 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. For details please refer to Section 3.12.1.
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 the DOE at the time of validation of the PoA has also been included to [92].
Records of arrangements for training and capacity development for personnel made available has been checked by SQS. The CME has presented its measures for continual improvements of the PoA to SQS, and it has been cross-checked during the on-site visits [72, 86].

Participants' in the specific CPA-001
The entity responsible for the proposed CPA-001 is Mabanaft Carbon India Pvt. Ltd., hereafter referred to as the CPA owner. No entities other than the entity responsible for CPA-001 are included in Section A.3 and Annex 1 of the specific CDM-SSC-CPA-DD.

Modalities of Communication
CAR 10 was raised because there was no full consistency in the draft MoC and the signed version was missing. PPs submitted an updated and signed version of the MoC form [107]. CAR closed.
The Modalities of Communication statement, including its annexes, is complete and has used the latest applicable version of the form "Modalities of Communication statement" (F-CDM-MOC).

3.3 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 [89] complies with relevant forms and guidance and is appropriate to the type of project activity.

A generic CPA-DD [91] 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 [90, 91] comply with relevant forms and guidance and are appropriate to the type of project activity.

CAR 6 was raised: Several equations have no sources and/or cannot be read due to low quality in presentation (PoA-DD, p.30ff.). Some pages contain typos (PoA-DD, p. 34f. /40; CPA-DD, p.7f.). Table 9 in CPA-DD is double. Links to webpages/ references have been removed or are missing. Exact scientific approach to references is not consistently applied. During validation SQS also stated that the version of Standards, Tools and Guidelines used did not reflect the valid status. In response to the CAR the PoA-DD and CPA-DDs have been updated accordingly. Furthermore the tables considering parameters monitored during the crediting period have been updated, as the used format was not correct. Also the overview tables with the overview of the emission reductions and gases included in the project boundary have been updated to the correct template. All Standards, Tools and Guidelines have been updated to the latest valid versions. CAR closed.

3.4 Project description

Technical description of the Programme of Activity (SSC PoA-DD)

The programme aims at creating a marketing platform for supporting the usage increase 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 India. It will contribute to transforming the Indian 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.

Validation method

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

- A desk review of the CDM-SSC-PoA-DD and the POA specific CDM-SSC-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 between 25-27 July, 2011 and 19-20 December, 2011 and interviews with local project participants, LED technology suppliers, local electricity companies, financial experts and officials from the Indian Bureau of Energy Efficiency (programme of the on site visit and list of interviewees are provided in Appendix A). CDM-PoA-DD was first published for global stakeholder consultation, 1 July, 2011. Due to an unresolvable CAR (local stakeholders were not invited with regard to the PoA prior to submission of the PoA-DD to SQS) the validation has been terminated and restarted after local stakeholders have been invited and the outcome of the consultation has been reported with regard to the total PoA in the PoA-DD. Since the project design itself has not been changed both on-site visits are reflected in the validation report of the current validation.
- Cross-checks with independent sources and plausibility checks.
- Follow-up interviews with project participants (Appendix B).

CPA-001 (specific SSC CPA-DD)

The proposed small-scale CDM programme activity (hereafter referred to as CPA) consists of the distribution and installation of LED lighting equipment under the 'LED's save energy' Programme of Activities (hereafter referred to as PoA). Targeted end-users for CPA-001 are project sites owned, managed, operated or built by IOT Infrastructure & Energy Services Ltd. (IOT). IOT is a professional, technical and logistics solutions provider with a diverse portfolio of businesses comprising Engineering Procurement and Construction (EPC), Terminalling and Upstream Services. The company is a joint venture of Indian Oil Corporation Limited and Oiltanking. CPA-001 will target IOT sites, located all over India. The project participants have convinced IOT to participate under the CPA-001 and install LED lighting equipment. IOT end-users can obtain the LED lighting

equipment at favourable conditions due to CER benefits. A pilot IOT site has been identified in the area of Mumbai, namely the Navghar oil terminal. This pilot end-user is considered to be a typical IOT end-user and the estimated savings of this site have been used for the total CER estimations. The project participants expect that it takes up to three years for all IOT sites to be retrofitted and included. Under CPA-001 only brownfield locations are eligible.
LED lighting equipment (LED stands for Light Emitting Diodes) under this CPA may include both an LED light source (lamp) as well as an LED luminaire (including lamp and corresponding power conversion electronics, thermal management, fixture etc.). The CPA is sized according to the estimated savings for the pilot IOT site multiplied by the number of sites owned, managed, operated or built by IOT.
The proposed SSC-CPA will abate greenhouse gas emissions through the increase in energy efficiency of the targeted lighting systems and the corresponding fossil-fuel combustion avoided to generate the electricity. CPA-001 is expected to reduce 62 578 tons of CO_2e over the selected ten year crediting period. A clarification was requested regarding the missing unique identification of the first project site. The CL was closed due to CAR 3 and CAR 14. Specific CPA-DD version 4.0 of CPA-001 contains now a list of the currently identifed IOT sites (name of site, city, state) to be included in the first CPA. The geographical coordinates of CPA-001 are 18.90961 N, 73.02059 S. This is the location where the first lights are installed (Navghar Terminal) and has been verified by SQS.
CAR 14 was raised: In SQS' opinion the specific CPA-DD version 2.0, dated 10/09/2011 [74] published for global stakeholder consultation was not based on a real case. Project description as well as baseline calculation was based on a rather hypothetical scenario. Followed by a general lack of verifiable justification SQS was not able to validate the eligibility of the CPA under the proposed PoA.
In response to the CAR, the description of the specific CPA-DD (CPA-001) has been revised [80] to make it more specific to include only sites that are owned, managed, operated or built by IOT. Furthermore the PPs decided that only Brownfield locations can be included under CPA-001. Also, line diagrams of the first foreseen end-user site have been added in supporting documents [54-58]. Furthermore, a list of IOT sites has been added as supporting document [60]. According to the revised specific CPA-DD, targeted end-users for CPA-001 are project sites owned, managed, operated or built by IOT Infrastructure & Energy Services Ltd. (IOT). CPA-001 will target IOT sites, located all over India. The project participants have convinced IOT to participate under the CPA-001 and install LED lighting equipment. IOT end-users can obtain the LED lighting equipment at favourable conditions due to CER benefits. A pilot IOT site has been identified in the area of Mumbai, namely the Navghar oil terminal. SQS considers this pilot end-user site inspected during the first on-site visit to be a typical IOT end-user and the estimated savings of this site as a valid approach for the estimation of the total CER estimations.
SQS assessed the supporting documentation against the information provided in the revised project description for CPA-001 and the observation made at the first foreseen end-user site (Navghar oil terminal). The validation team concluded that the revised specific CPA-DD represents a real case and provides enough information to validate its inclusion to the PoA-DD. Detailed analysis of usability and validation of the eligibility criteria are discussed in Chapter 3.12.2 and 3.12.3. CAR closed.

In CL 5 SQS stated an inconsistency of end-users in CPA-001. In response to the CL and CAR 14, discussed above, all values of the specific CPA-DD have been updated. CL closed.

Validation method
The accuracy and completeness of the CPA-001 description was validated by:
- A desk review of the specific CDM-SSC-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 at the IOT Navghar oil terminal 25 July, 2011, interviews with local project participants, LED technology suppliers, local electricity companies, financial experts and officials from the Indian Bureau of Energy Efficiency (programme of the on-site visit and list of interviewees are provided in Appendix A).
- Cross-checks with independent sources and plausibility checks.

- Follow-up interviews with project participants (Appendix B).

The DOE's validations opinion is that the project description is accurate and complete. The CME has developed an Operational Manual [92] 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 specific CPA-DD [80] based on a real case (see Section 3.12.3).

3.5 Baseline and monitoring methodology

3.5.1 General requirement

In the PoA-DD the scope was missing. This has been addressed in CAR 20. The revised PoA-DD contains now a clear statement that the programme of activities belongs to UNFCCC Scope 3 Energy Demand, TA 3.1 Energy Demand. CAR closed.

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

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

- 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.
- Guidelines on the demonstration of additionality of small-scale project activities version 9 (EB 68 Annex 27) previously known as Attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities

3.5.2 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). CAR 1 was raised regarding Greenfield sites (resolution of CAR 1 is discussed in clause 3.5.4 baseline identification).
PoA CPA eligibility criteria N°14 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°14 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.
CAR 5 and CAR 7 were raised regarding the specifications of the technologies including the level and type of services and the performance specifications including compliance with testing/certification. To the DOE it was unclear which type of LED lamp (watt) may/will replace which type of non-LED lamp (watt) and how the same service level (lux/m^2) is ensured and verified for Brownfield and Greenfield project sites. The resolution of these CARs is described in section 3.7 Monitoring plan.
CAR 11 was raised: Level of service as per EB 65 Annex 3 para 14 (c) was not listed as CPA eligibility criteria. In response to the CAR, level of service considering the applicability of AMS-II.C para. 2 was added as CPA eligibility criteria. CAR closed. The AMS-II.C applicability criteria are also reflected in the Section E.2 of the PoA-DD and the CME operational manual [92]. On the basis of the resolution of the three CARs discussed above, 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 contains 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 programme boundary is India. 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.
CAR 18 was raised: The monitoring plan of the PoA/ CPA did not reflect the requirements of para. 12 ASM-II.C. In response to the CAR Section E.7.1.Data and parameters to be monitored by each CPA has been revised. The parameters ‘number’ (ni) and ‘power’ (pi) have been updated to include the following procedure: 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 verifcation 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 verifcation. This change was also incorporated in the CME operational manual procedure [92]. CAR closed. 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 (m^3 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 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.
CAR 2 was raised: There is no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,V13, §17 to allow for neglectance of leakage. Please ensure that this procedure determines in detail the roles and responsibilities, incl. CME and provides assurance that future legislation on electronic waste of replaced lamps is respected in line with PoA-DD, p. 4 and that legal compliance can be regularly verified by a DOE.
In response to CAR 2 the project participants have included the procedure for colleting and/or storing including scrapping, as per AMS-II.C version 13 para. 17 under the CME operational manual procedure CME/02/12 [92] 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/02/12 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). CAR closed. Procedure CME/02/12 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.

3.5.3 Project boundary

Clarification on an unambiguous PoA boundary as well as its consistency between PoA-DD and the CPA-DDs has been resolved by CL 14. The boundary set in the DDs published for global stakeholder consultation [73, 74, 75] was not in conformity with the delineation of the Indian electricity grid [40, 63] The boundary as defined in the revised PoA-DD and the CPA-DD is in now in line with EB60, Annex 26. 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 India.

CL 11 was raised: SQS requested clarification on the lack of relevant national and sectoral policies in the PoA-

DD. The PPs replied that no mandatory policies with regard to LED lighting equipment exist. The information has been cross-checked against the validation report of the registered CDM –PoA 3223 and information published on the website of the Indian Bureau of Energy Efficiency [64] and found correct. CL closed. In the establishment of the boundary of the PoA the CME has taken into consideration all applicable national and sectoral policies and regulations within that chosen boundary.

The DOE validated the project boundary of CPA-001 by conducting a site visit to a typical and representative site for all the other sites listed in CPA-DD which are also operated or managed by IOT Site visit to the IOT Navghar Terminal, JNPT, Navi Mumbai, the first project site of CPA-001 was done on 25 July, 2011. The first LED lighting equipment to be installed under CPA-001 is a Brownfield activity that retrofits outdoor lighting equipment (terminal lighting, rail gantry lighting, tank lighting etc.) at the Navghar terminal of IOT near Mumbai. At this site high-pressure gas discharge lamps such as high-pressure mercury vapour lamps are installed. These lamps provide for relatively low efficiencies. 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, based on the guidance of the National Lighting Code 2010 [35]. The currently installed equipment and its replacement are listed in in the DD of CPA-001 [90]. Line diagrams of the baseline lighting equipment to be replaced by the project have been made available to SQS [54-58]. As verified on-site the source of electricity is from the grid. Based on the list of identified IOT end-user sites (Table 1 specific CPA-DD), SQS confirms that the geographic boundary of the CPA-001 coincides with the geographical boundary of the PoA, which is India.

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_2O	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_2O	No	Excluded for simplification. Minor Source of emission. Consistent with baseline.

CO_2 is included as this is the main emission source, methane and nitrogen oxide are excluded for simplification purposes. The PoA-DD has described the GHG emission sources that will occur during the operation 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 is expected to contribute more than 1% of the overall expected average annual emission reductions, which are not addressed by the applied methodology.

3.5.4 Baseline identification

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 [2, 9, 18]; 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.

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. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity.

Scenario 3 Programme achieving the same results 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 has been discussed with interviewees during the on-site visit and confirmed to be complete. Based on interviews and regulatory information published by BEE [64, 87] there are no mandatory policies and/or regulations in India which mandate the installation of LED lighting equipment at time of validation. Furthermore based on interviews performed on-site, SQS concluded that the Indian 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. In CL 19 SQS requested the project participants to explain why the identification of baseline scenarios.has been revised in PoA-DD v.5.1. The PPs have decided to update the alternatives defined for the project activity. However, this was only changed under Section A.4.3. The main reason for the change is that scenario 3 contained the phrase " Programme achieving the same results with different technology". The PP judged this not as a realistic scenario, as such a solution is technologically not available. Hence this was removed. In the GSC scenario's there was twice mentioned: "of a different incentive mechanism". The PPs have decided to make the scenario's more clear by defining scenario 2 as "Same programme without use of the CDM" and scenario 3 as " Programme achieving the same results with a different incentive mechanism". It's SQS' opinion that the baseline alternatives to the project scenario are more clear. CL closed.

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,.
   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. This is a potential alternative as required by EB 61 Annex 21, para. 19.
3. Scenario 3: Programme achieving the same results 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.

CAR 1 was raised: SQS notified that the operationalisation to determine the "most common practice" i.e. the baseline scenario in the Greenfield case, was not adequately provided. There was no adequate clear procedure for the establishment of the baseline for all potential or targeted Greenfield activities (incl. targeted lighting areas, criteria, database with least electricity consuming available non–LED lighting equipment that determines how the light output service level in Lux as recommended for the application in question by national standard and/or code would be provided. Furthermore, it was not clear how it would be ensured that the recommended standard would have been applied (to avoid overestimation of baseline emissions) and how general and or specific market segment increases of LED penetration rate over time that are not induced by the PoA will be accounted for.
The CME clarified 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 to the POA-DD. In response to the CAR, a procedure for the establishment of a conservative baseline for Greenfield projects has been established in the CME operation manual, procedure CME/04/08 [92]: To identify the classification of the lamps in question the CME procedure for determing stratification of LED lighting 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.
In a second step the lux for targeted Greenfield lighting areas according to the Indian National Lighting Code [35] will be identified. Because the methodology does not provide specific equipment performance data, the National Lighting Code of India, published by the Bureau of Indian Standards in 2010 [35], as identified by the CME is the best available Indian standard for the performance of the equipment type. The standard as well as the procedure CME/04/08 provided in the CME Operation Manual [92] are in accordance with EB 61 Annex 21 para 9 and 19 respectively, and are deemed applicable to this type of equipment.
Then, the most efficient (watt) available non-LED lighting equipment that would fulfil the service level as defined in the National Lighting Code 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 kms of the projects boundary; or (b) within the same city or town jurisdiction. 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 a reputable national standard 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). CAR closed.

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 interviews, regulatory information published by BEE [64, 87] there are no mandatory policies and/or regulations in India 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 Indian legislation does not prevent any of the above scenarios to occur.

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) 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 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). 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 National Lighting Code 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 during the on-site visit [72, 86] and by supporting documents provided by the project participants [50, 54-58, 60]

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' 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 for the proposed CDM PoA. DOE considers the list of alternatives to be complete.

3.5.5 Algorithms and/or formulae used to determine emission reductions

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

<u>Baseline emissions</u>
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 *Qref,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_2e)
$E_{BL,y}$	Energy consumption in the baseline in monitoring period *y* (kWh)
$EF_{CO2,ELEC,y}$	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 Central Electricity Authority (CEA) of India. 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.

Σi 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. A 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

The description of the parameters is according to the methodology.

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_2e)

$E_{P,y}$ Energy consumption due to the project in monitoring period y (kWh)

$EF_{CO2,ELEC,y}$ Emission factor in monitoring period *y* calculated in accordance with "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

Σk The sum over the group of "k" LED lighting equipment 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 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 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 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. A 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

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 CPA level. The size of the project sample group used for arriving at these values is determined taking into consideration the latest version of the "General Guidelines for Sampling and Surveys for SSC project activities" and latest standard for sampling and surveys for CDM project activities and PoAs (EB 65, Annex 2). 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 respective CPAs.

A group of non-metered LED lighting equipment will be randomly identified on basis of the project database and will be subject to annual checks 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 (guaranteed by the LED manufacturer), 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. To be established per site, if this is not possible, a default value of 13 months (25%) is to be used.

The method is appropriate considering para. 13 (a) and 14 of the approved SSC methodology AMS.II.C.

<u>Leakage</u>
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 reductions 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* (tCO_2/y)

BE_y Baseline emissions from electricity consumption in year *y* (tCO_2/y)

PE_y Project emissions from electricity consumption in year *y* (tCO_2/y)

LE_y Leakage emissions in year *y* (tCO_2/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.

3.5.6 Data and parameters that are available at validation

$EF_{CO2,ELEC,y}$

The PoA-DD clearly states that for each CPA $EF_{CO2,ELEC,y}$ shall be calculated according to the latest approved version of the Tool to calculate the emission factor for an electricity system. Any SSC-CPA owner shall apply the latest grid emission factor database available on the Indian Central Electricity Authority website and fix the value *ex-ante* for the fixed crediting period of 10 years.

Following the provisions in the PoA-DD, for CPA-001 theTool to calculate the emission factor for an electricity system (Version 02.2.1) has been used to calculate the emission factor for an electricity system. This is done by calculating the 'operating margin (OM)', the 'build margin (BM)' and the 'combined margin (CM)'. According the tool six steps in order to calculate the operating margin, build margin and the combined margin have been followed in in the CPA-DD for CPA-001:

Step 1: Identify the relevant electricity systems

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Step 3: Select a method to determine the operating margin (OM

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

Step 5: Calculate the build margin (BM) emission factor

Step 6: Calculate the combined margin (CM) emission factor

Step 1: Identify the relevant electric power system

For CPA-001 the latest available version (7.0) of the "Baseline Carbon Dioxide Emissions From Power Sector" developed by the Central Electricity Authority is applied. The data is published on the Central Electricity Authority (CEA) website[1]. This has been checked by SQS and found correct.

Step 1: Identify the relevant electricity systems

CEA is an official source of Ministry of Power, Government of India and has worked out baseline emission factors for various grids in India and made them publicly available. The Indian electricity system is divided into two

[1] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

power grids, the North- East- West- North- East (NEWNE) and the Southern grid. Since individual projects in CPA-001 can be located anywhere across India, the emission factor is calculated for both grids.
The baseline emission factor (including imports) of both regions published by CEA is considered for calculation of emission reductions due to displacement of electricity in accordance with the 'Tool to calculate the emission factor for an electricity system (Version 02.2.1)'. This has been assessed by SQS and found correct.

The following geographical scope of the two electricity grids as illustrated in Annex 3 of the specific CPA-DD is consistent to the delineation of the grids on the CEA website:

NEWNE Grid				**Southern Grid**
Northern	Eastern	Western	North-Eastern	Southern
Chandigarh Delhi Haryana Himachal Pradesh Jammu & Kashmir Punjab Rajasthan Uttar Pradesh Uttarakhand	Bihar Jharkhand Orissa West Bengal Sikkim Andaman- Nicobar	Chhattisgarh Gujarat Daman & Diu Dadar & Nagar Haveli Madhya Pradesh Maharashtra Goa	Arunachal Pradesh Assam Manipur Meghalaya Mizoram Nagaland Tripura	Andhra Pradesh Karnataka Kerala Tamil Nadu Pondicherry Lakshadweep

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
Under this step project participants may choose whether to include off-grid power plants to calculate the operating margin and build margin emission factor of the Indian electricity system. It was decided to not include off-grid power plants. This is in line with the Tool and found correct.

Step 3: Select a method to determine the operating margin (OM)
In accordance with the tool, the calculation of the operating margin emission factor ($EF_{grid,OM,y}$) must be based on one of the following methods:

a) Simple OM
b) Simple adjusted OM
c) Dispatch data analysis OM
d) Average OM.

The project participants selected the simple OM since low-cost/must-run resources constitute less than 50 % of total grid generation as required by the Tool. In Annex 3 of the CPA-DD for CPA-001 it is shown that 5-year average of low-cost/must-run power plants constitute 17,7% of the NEWNE grid and 24% of the Southern grid.

Share of Must-Run (Hydro/Nuclear) in % of net generation:

	2006-07	2007-08	2008-09	2009-10	2010-11	5-year average
NEWNE	18,5%	19,0%	17,4%	15,9%	17,6%	17,7%
South	28,3%	27,1%	22,8%	20,6%	21,0%	24,0%

SQS has checked the values share of Must-Run (Hydro/Nuclear) in % of net generation presented in Table 10 (CPA-DD) against the values published by CEA. The values are correctly presented in the specific CPA-DD. Therefore it is DOE's opinion that the Simple OM method can be applied.

For the Simple OM the emission factor can be calculated using either of the two following data vintages:

1) *Ex-ante* option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
2) *Ex post* option: The year in which the project activity displaces grid electricity, required emissions factor to be updated annually during monitoring. If the data required calculating the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1, or y-2) should be used throughout all crediting periods.

The emission factor for CPA-001 is calculated using the *ex-ante* option: i.e. using a 3-year average data. The OM is calculated using 3 year data calculated by Central Electricity Authority in their CO_2 baseline database version 7.0, January 2012.

Step 4: Calculation of the operating margin emission factor

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated:
Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:
- The necessary data for Option A is not available; and
- Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
- Off-grid power plants are not included in the calculation.

For CPA-001, Option A has been used. In the simple OM method, the emission factor is calculated as generation weighted average emissions per electricity unit (tCO_2/MWh) of all generating sources serving the system, not including low-operating cost and must-run power plants. The data vintage option selected is the *ex-ante* approach, where a 3 year average OM is calculated. The CEA baseline is derived using the following formulae to calculate simple OM.

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

Equation 1

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$FC_{i,,y}$	Amount of fossil-fuel type *i*consumed in the project electricity systemin year *y* (mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil-fuel type *i*in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	CO_2 emission factor of fossil-fuel type *i*in year *y* (tCO_2/GJ)
EG_y	Net electricity generated and delivered to the grid by all power sources serving the

	system, not including low-cost/must-run power plants/units,in year *y* (MWh)
i	All fossil-fuel types combusted in power sources in the project electricity systemin year *y*
y	The relevant year as per the data range chosen in Step 3

The formula above is correctly selected and displayed in Annex 3 of the specific CPA-DD for CPA-001. The description of the parameters is according to version 02.2.1 of the Tool to calculate the emission factor for an electricity system.
The operating margin emission factor has been calculated using a 3-year data range from CEA database that uses the calculation approach described below:

	2008-09	2009-10	2010-11	Weighted average
NEWNE (tCO_2/MWh)	1,007	0,978	0,971	0,984
South (tCO_2/MWh)	0,973	0,942	0,942	0,951

The values presented in Table 11 of the specific CPA-DD are consisitent to those published by CEA.

Step 5: Calculate the build margin (BM) emission factor

In terms of the range of data, project participants can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor *ex ante* based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, *ex post*, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated *ex ante*, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.
For the CPAs under the proposed PoA Option 1 is choosen to calculate the build margin emission factor. It is SQS' opinion that the selection of Option 1 is appropriate since the crediting period of each CPA to be included under the PoA is 10 years fixed [90, 91]. Further, in the case of CPA-001 the build margin emission factor is calculated *ex-ante* based on the most recent information available at the time of submission of the specific CPA-DD and is fixed for the entire crediting period.

According to the Tool to calculate the emission factor for an electricity system (version 02.2.1), the sample group of power units *m* is determined by:

a) Identifying $SET_{5\text{-units}}$: the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently, and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-units}}$, in MWh);

The following five power plants from the NEWNE grid have been identified:

Name of power plant	Data of commisioning	Electricity generation [MWh]
MEJIA TPS EXT	2011-03-26	1,446
FARAKKA STPS	2011-03-23	1,120
PRAGATI CCCP -III	2011-02-14	3,719
BARSINGAR LIGNITE	2011-01-25	135,429
KORBA STPS	2010-12-26	943,639
	AEGSET-5-units	1,085,353

The power plant Koteshwar (two units), located in the NEWNE grid, commissioned on 29 and 31 March, 2011 has been excluded from the list above since its 2010-11 electricity generation was 0 MWh.

For the Southern grid the following five power plants have been identified:

Name of power plant	Data of commisioning	Electricity generation [MWh]
KAIGA	2011-01-20	204,149
RAYAL SEEMA	2010-12-31	145,494
STERLITE TPP (Unit 1)	2010-12-29	317,142
PRIYADARSHNI JURALA	2010-11-09	12,246
STERLITE TPP (Unit 2)	2010-10-14	579,128
	AEGSET-5-units	1,258,159

The power plant Simhadri, located in Southern grid, commissioned on 3 March, 2011 has been excluded from the list above since its 2010-11 electricity generation was 0 MWh.

b) Identifying SET≥20%: the set of power units, excluding power units registered as CDM project activities, that started to supply the grid most recently and that comprise 20% of the annual electricity generation of the project activity system (AEG_{total}, in MWh), and determine their annual electricity generation ($AEG_{SET\geq20\%}$, in MWh);

The following SET≥20% has been identified for the NEWNE grid:

	Electricity generation [MWh]
AEG_{total}	579,181,175
20% of AEG_{total}	115,836,235
$AEG_{SET\geq20\%}$	117,779,227

The following SET≥20% has been identified for the Southern grid:

AEG_{total}	173,925,080
20% of AEG_{total}	34,785,016
$AEG_{SET\geq20\%}$	35,267,933

SQS has assessed the values in sub-steps a) and b) presented above and in Annex 3 of specific CPA-DD against the data published in version 7 of "Baseline Carbon Dioxide Emissions From Power Sector" developed by the Central Electricity Authority. No inconsistencies found. Determining SET_{sample} from $SET_{5\text{-units}}$ and $SET_{\geq20\%}$, by selecting the set of power units that comprises the larger electricity generation;

The values in sub-steps a) and b) show that for the NEWNE and the Southern grid $AEG_{SET\geq20\%}$ is higher than $AEG_{SET\text{-}5\text{-units}}$. Therefore, in both cases, SET_{sample} equals $AEG_{SET\geq20\%}$. All power plants included in the SET_{sample}

groups started to supply electricity to the grid less than 10 years ago. As correctly interpretated in Annex 3 of CPA-001, SET_{sample} can be used to calculate the build margin for each grid.

Build margin
NEWNE 0.859 tCO_2/MWh
South 0.734 tCO_2/MWh

The BM is consistent to the data published in the latest "Baseline Carbon Dioxide Emissions From Power Sector" developed by the Central Electricity Authority.

Step 6: Calculate the combined margin emission factor

The combined margin emission factor is determined with the following equation;

$$EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}$$
Equation 1

Where;

$EF_{grid,CM,y}$	Combined Margin CO_2 emission factor in year y ($EF_{grid,BM,y}$)
$EF_{grid,BM,y}$	Build Margin CO_2 emission factor in year y ($EF_{grid,BM,y}$)
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	Weighting of operating margin emissions factor (%)
w_{BM}	Weighting of build margin emissions factor (%)

Annex 3 of the CPA-DD for CPA-001 correctly present the equation and the parameters listed above.

The following default values should be used for w_{OM} and w_{BM}: Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.
All other projects: w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period, and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.
Considering that this programme of activity does not involve wind and solar power generation, the default value used for w_{OM} and $w_{BM}$is 0.5. SQS deems the selection of the default values as approprate. The resulting emission factor of the combined margin as illustrated in Table13 Annex 3 of specific CPA [91] is correctly calculated according the latest "Baseline Carbon Dioxide Emissions From Power Sector" (version 7) developed by the Central Electricity Authority and the Tool to calculate the emission factor for an electricity system (version 02.2.1) ahs been correctly used:

Grid	Simple Operating Margin	Build Margin	Combined Margin
NEWNE (tCO_2/MWh)	0.984	0.859	**0.921**
South (tCO_2/MWh)	0.951	0.734	**0.843**

As described above the parameter is fixed *ex-ante* for each CPA. The DOE's validation opinion is that in CPA-DD for CPA-001 [90] the values are correctly presented and conservative.

Data / Parameter:	**$EF_{CO2,ELEC,y}$**
Data unit:	$kgCO_2/kWh$
Description:	Emission factor for electricity displaced from the NEWNE or South grid
Source of data used:	The latest available version (7.0) of the "BASELINE CARBON DIOXIDE EMISSIONS FROM POWER SECTOR" developed by the Central Electricity Authority is applied. The data is published on the CEA website: http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Value applied:	NEWNE grid 0.921, South grid 0.843
Justification of the choice of data or description of measurement methods and procedures actually applied:	Project developer has obtained latest data from governmental sources and applied calculation methodology specified in "Tool to calculate the emission factor from an electricity system (version 2.2.1)" (see Annex 3 for detailed calculation methodology).
Means of validation:	SQS checked the value applied against the baseline carbon dioxide emission database version 7.0 [53] published by the Indian Central Electricity Authority. Further, the conformity of the database with the Tool to calculate the emission factor from an electricity system (version 2.2.1) has been validated. Reference provided by the PPs [40] has been checked and cross-checked against [63, 88]. Grid-related procedures in the operational manual [45, 46] as well as their application to the CER calculation [52] have been checked. 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.CL 4 was raised regarding the assignment of end-user sites to the appropriate grid (NEWNE or South). In response to the request the CME operational manual has been updated by a procedure (CME/02/24) to determine the relevant grid emission factor for LED lighting equipment. CL closed. SQS confirms that the procedure in the CME operational manual enables a correct assignment of each site to the relevant grid. The values applied for NEWNE grid and South grid are correct.
Findings/ Conclusion CPA-001	CAR 15 was raised: Estimated emission reduction in CPA-DD-001 (B.5.3) was not correctly calculated. Table 1 was not consistent to Table 6. In response to the CAR, CPA-DD-001 has been updated, following the latest calculations taken into account only sites that are owned, managed, operated or built by IOT. This is also presented in supporting document [52]. SQS has checked the updated CPA-DD and the CER calculation [52] and concluded that in CPA-001 CER calculation doesn't consider the assignment of the projected IOT sites to the relevant grid as per Annex 3 to the CPA-DD and the procedure defined in CME/02/24. In response to the CAR each identified IOT project site of CPA-001 has been assigned to the relevant grid [94] and the corresponding CER calculation has been accordingly revised [97] CAR closed. The parameter is fixed *ex-ante*. The CEA database version 7.0 is the latest available at time of validation and it was calculated by applying version 2.2.1 of the Tool to calculate the emission factor from an electricity system. The DOE's validation opinion is that the values are conservative and appropriate.

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:

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 considered reasonable in the context of the proposed CDM PoA.

Methodology application

The DOE's validation opinion is that the baseline methodology and the Tool to calculate the emission factor from an electricity system has been applied correctly to calculate project emissions, baseline emissions, leakage, and emission reductions. The emission factor for electricity displaced is based on the latest official emission factor for electricity database version 7.0 [53] published by the Indian Central Electricity Authority. The database is in accordance with the Tool to calculate the emission factor from an electricity system (version 2.2.1).

Reliability

All estimates of the baseline emissions can be replicated using the data and parameter values provided in the

CPA-DD for CPA-001.

3.6 Additionality of the Programme of Activity

Additionality is demonstrated on PoA level using the criteria outlined in the Guidelines on the demonstration of additionality of small-scale project activities (version 9). To ensure a well-developed discussion of additionality elements from the 'Tool for the demonstration and assessment of additionality (version 6.0) 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 (see also CAR 19 below). In the PoA-DD additionality is demonstrated by the following steps:
Step 1. Identification of alternative scenarios;
Step 3. Barrier analysis; and
Step 4. Common practice analysis.
CAR 19 was raised: Within SSC projects the barrier analysis approach can be carried out by different ways including the techniques that resemble the elements of the Additionality 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 Additionality 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 Additionality Tool the PoA DD [76] wording is misleading in its references to the Additionality Tool.
In due consideration of the following revisions of the PoA-DD the CAR was closed. Following the CAR, Section A.4.3 of the PoA-DD [89] has been updated to correctly reflect the used tools:
Additionality is demonstrated using the criteria outlined in the Guidelines on the demonstration of additionality of small-scale project activities (version 9). 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 'Tool for the demonstration and assessment of additionality (version 6.0) 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 (version17) 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 save Energy 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.

The proof of additionality was checked by desk review including cross- and plausibility checks and by interviews. 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 a marketing platform for LED lighting equipment. As substantiated by evidence [5,6] the programme will be operated from revenues resulting from the sale of carbon credits and contributions from CPA owner seeking access to CER revenues to enhance their market position. The programme will enable different manufactures, distributors and developers to use additional CER income for a faster roll out of LED lighting technology and to compete with less energy efficient products. There is no such platform aimed at enhancing market entry of high quality LED lighting equipment products in India. The LED's save energy programme is a commercial initiative solely based on expected CER revenues. These revenues

make it possible for the CPAs under the platform to use several options to realise a faster roll out of LED lighting technology. End-users and other stakeholders participating in SSC-CPAs under the PoA will do so through a voluntary collaboration with the CME.

3.6.1 Starting date of a PoA/CPA

The DOE is not required to assess prior consideration of CDM for PoAs, as it is expected that no component of the programme will commence prior to the start date of validation.
The CDM-SSC-PoA-DD and its CPA-DDs were first published for global stakeholder consultation 1 July, 2011. Due to a unresolvable CAR (local stakeholders were not invited with regard to the PoA prior to submission of the PoA-DD to SQS) the validation has been terminated by the DOE and restarted after local stakeholders were invited and the outcome of the consultation was reported with regard to the total PoA in the PoA-DD version 2.1 dated 19/12/2011. After restart of the validation PoA-DD version 2.1 has been republished 20/12/2011 for another global stakeholder consultation on unfccc website.
CAR 13 was raised: The CPA-DDs do not contain a confirmation 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 is first published for global stakeholder consultation. The CPA-DDs have been amended so that there will be no start date of any CPA prior to the first date of publication. Thus the generic and the specific CPA-DD now 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 the first time for global stakeholder consultation, 01/07/2011. Further CPA start date has been addressed by CPA eligibility criteria N° 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. CAR closed.

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 01/12/2012 with a length of 28 years. The on site visit and follow up interviews revealed that the programme is not in operation yet. No implementation or construction or real action has taken place prior to the validation process. Clarification (CL 2) regarding an inconsistency in the date of the first LED lighting equipment installation has been requested. PP referred to project delays and updated the starting date accordingly. CL closed.
The starting date of CPA-001 is set as 01/12/2012, the 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. By CAR 21 SQS requested the PP to indicate the crediting period of the first CPA in the CPA DD. The PP have updated in the CPA-001-DD under Section A.4.3.1 as: starting date of the crediting period is set as the later of 01/12/2012, or the date of including the CPA-001 under the registered PoA. Following this change the ER calculations for CPA-001 have been updated. CAR closed.
Specific and generic CPA-DD clearly states 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 first published for global stakeholder consultation, 01/07/2011. Crediting period of any CPA is set as 10 years fixed.

It is SQS' opinion that the PoA starting date and start date of any CPA to be included in future will be soundly proven and to be 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.

3.6.2 Identification of alternatives

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. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity.

Scenario 3 Programme achieving the same results 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.

The Indian government has promoted energy efficiency through initiatives such as equipment labels, outreach activities, and voluntary building codes. Occasionally, it has implemented DSM pilot programs (eg. in Maharashtra state). In December 2009, the Indian government announced that the National Mission on Enhanced Energy Efficiency (NMEEE) will be implemented from April 1, 2010. Four key approaches are envisioned under NMEEE – creation of market for tradable energy savings certificates for large industrial customers, market transformation, creation of financing platform to facilitate ESCO activity, and development of broader economic framework (e.g. tax incentives, public procurement, etc.) to support energy efficiency . The Bureau of Energy Efficiency (BEE) was set up under the Energy Conservation Act, 2001 to promote energy efficiency.The various mandatory and voluntary provisions of the Act that have been implemented by BEE in the form of projects and schemes. Based on interviews and regulatory information published by BEE [64, 87] there are no mandatory policies and/or regulations in India which mandates the installation of LED lighting equipment at time of validation. Furthermore based on a regulatory status report [103] and interviews performed on site, SQS concluded that the Indian 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.

3.6.3 Investment analysis

In line with the Guidelines on the demonstration of additionality of small-scale project activities (EB 68 Annex 27) previously known as Attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities no investment analysis has been conducted. SQS confirms that there is no obligation to conduct an investment analysis.

3.6.4 Barrier analysis

Based on the relevant requirements of the Guidelines on the demonstration of additionality of small-scale project activities version 9.0 (EB 68 Annex 27) project participants provided an explanation to show that the project activity would not have occurred anyway due to the following barriers:

- Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- Other Barriers (institutional, managerial resources and capacity to absorb new technologies)

In order to validate the barrier analysis and to determine whether the two 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, Tool for the demonstration and assessment of additionality (version 6.0), and request for clarification (SSC_630) to the Small-Scale Working Group.

In CL 19 SQS requested the project participants to explain why the barrier analysis has been revised in PoA-DD v.5.1. The PP have decided to update the alternatives defined for the project activity. The main reason for the change is that scenario 3 contained the phrase " Programme achieving the same results with different technology". The PP judged this not a realistic scenario, as such a solution is technologically not avialable. Hence this was removed. In ths GSC scenario's there was twice mentioned: "of a different incentive mechanism". The PP have decided to make the scenario's more clear by defining scenario 2 as "Same programme without use of the CDM" and scenario 3 as " Programme achieving the same results with a different incentive mechanism".Section A.4.3 and section E.4 of the PoA-DD have been made consistent by replacing the "GSC" scenario's still included under Section E.4 with the scenarios stated under A.4.3. The Project Particpants have also updated the section on the demonstration of additionality (A.4.3). Up to version 5.0 of the PoA-DD the *Tool for the demonstration and assessment of additionality*' (Version 5.2). However, changes in this tool (v 6.0) had consequences for the demonstration of additionality for LED's save energy PoA. In the new version a detailed definition of what a prevailing practice barrier is, has been included. The result is that prevailing practice is now 1 on 1 related to the introduction of new technology. For FoIK the following definition has been developed: "The project is the first in the applicable geographical area that applies a technology that is different from any other technologies able to deliver the same output and that have started commercial operation in the applicable geographical area before the start date of the project". Where 'different technologies' have been defined in the context of FoIK as (para 7) "technologies that deliver the same output and differ by at least one of the following (..) a) Energy source/fuel b) Feed Stock c) size of installation (power capacity) (i)Micro, ii) Small, iii) Large. The result of this change was that according to the new version of the tool LED and incandescent/fluorescent lamps can not be considered a different technology, as not one of the options (Energy, Feed Stock, Size) differs (para7). Hence LED can not be considered FoIK. This implies that the demonstration of additionality, based on the prevailing practice barrier, is not correctly applied. The PP used the *Tool for the demonstration and assessment of additionality* as best practice, however its usage is not obligatory as per methodology AMS II.C version 13. Hence the PP decided to demonstrate additionality of the PoA based on the criteria outlined in Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities. This issue was also included in a request for clarifcation to the Small-Scale Working Group: SSC-WG (SSC_630) The prevailing practice barrier, the SSC WG clarified (SSC_630) that if Attachment A to Appendix B is used to demonstrate additionality of the SSC project, then it is not mandatory to use the "Tool for the demonstration and assessment of additionality" and thus the "Guidelines on additionality on first of its kind project activities (FOIK, EB 63, Annex 11) are also not mandatory. It is SQS' opinion that the changes in the PoA DD are transparently described and are a reasonable result of new versions of tools and guidelines. CL closed.

Technological Barrier

Barrier	Documentary Proof	Cross-check /plausibility	Statement / Conclusion SQS
Technological barrier	[7, 10, 47]	[66, 67, 68, 86]	The barrier is supported by documentary proof from reputed sources. The performed cross-check with technical literature supports the argumentation in 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: It 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.

Demonstration of the barrier in the PoA-DD
"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 luminaries design needs an integrated approach. The luminaries 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 luminaire 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 luminaries, it is difficult to convince customers of 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"

Assessment of the barrier by SQS
CL 12 was raised: The technological barrier was not sufficiently supported by evidence, in particular given recent developments for LED road lighting programs initiated in India. In response to the CL PP provided further evidence which is discussed below. CL closed.
SQS has checked the plausibility of the barrier with the following documentary proof provided by the PPs:

- Strategies Unlimited report, 2nd edition, February 2011: LED Luminaries, Market Analysis and Forecast [47]. 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 [7]

It is SQS' opinion that the documents above support the argumentation in the PoA-DD.
The documentary proof as well as the demonstration of the barrier has been cross-checked with publicly available technical literature:

- Pittsburgh University life-cycle assessment of different street lighting technologies [67]
- Lighting design guide to energy efficient lighting [66]
- U.S. DOE LED Street Lighting report on assessment of the performance of LED luminaries in a street lighting application on public roadways in San Francisco, California [68]

The technical literature confirm 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 prevent this type of proposed programme activity.

Does CDM alleviate the identified barrier?
The registration of LED’s save energy PoA under the CDM will enable the establishment and operation of a platform, aimed at enhancing market entry of high quality LED lighting equipment products. The programme will

be financed by CER revenues [5, 6]. Alleviation of the barrier is also demonstrated by eligibility criteria N°9, where CPA operators have to declare how the CPA will support end-users to overcome the barrier.

Other Barriers

Barrier	Documentary Proof	Cross-check /plausibility	Statement / Conclusion SQS
Other barriers (insitutional, managerial resources and capacity to absorb new technologies)	[7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 47, 99]	[86, 100, 101, 102]	The barriers are supported by documentary proof from reputed sources. Cross-checks, plausibility checks, knowledge of the audit team related to energy efficiency demand side management programme and interviews on-site support the argumentation in the PoA-DD. The barriers are objectively presented in the PoA-DD and deemed real. They will prevent the implementation of this type of proposed programme activity and each of its component project activities. The barriers do not prevent the implementation of the following alternatives: Scenario 1. It 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.

Institutional Barrier

Demonstration of the barrier in the PoA-DD
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. LED's Save Energy delivers a solution to overcome this institutional barrier.

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 India.

The local distribution companies (DISCOMs) add to the institutional barrier. Over 90% of the distribution business is owned by public utilities which are often found not responding to incentive structures. Some of the barriers to implementation of DSM programs in India, can be listed below as:

- The distribution utilities often lack necessary institutional capacity and funds to develop practical approach for undertaking energy efficiency and demand side management programmes;
- There are barriers relating to untested outcomes;
- Lack of clarity about baseline data and Monitoring & Verification protocol;
- Clear lack of energy efficiency awareness.

Assessment of the barrier by SQS

SQS has checked the plausibility of the barrier with the following documentary proof provided by the PPs:

- Strategies Unlimited report, 2nd edition, February 2011: LED Luminaries, Market Analysis and Forecast [47]. 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 [7]
- Jackson, J. (2010): Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 p. 3865-3873 [8].
- REEEP Energy Efficiency Coalition [9].
- Taylor et al. (2008): Financing energy efficiency; lessons from Brazil, China, India and beyond, World Bank [11].
- DSM Information Hub, Finance Overview, Bureau of Energy Efficiency [99].
- Vashishtha , S. and Ramachandran, M. (2006): Multicriteria evaluation of demand side management (DSM) implementation strategies in the Indian power sector, in: Energy, Volume 31, p.2210-2225 [16].
- K. Heer (2011): The challenge of up-scaling efficient lighting in the developing world, University of Utrecht [10].

The supporting documents listed above are from reputed sources. They support the argumentation in the PoA-DD. In order to check the plausibility in the context of India the audit team interviewed representatives of financial institutions, local electricity distribution companies, officials from BEE and LED technology suppliers during the on site visit [86]. The interviewees confirmed that an introduction of LED lighting equipment as a DSM initiative is prevented, in particular by barriers related to lack of experience in LED technology and a lack of appropriate institutional structures. Furthermore demand side programmes are not directly related to Distribution Utility's core business of electricity supply and DSM is not mandated in any legal framework. The documentary proof as well as the demonstration of the barrier has been cross-checked with the following scope specific literature:

- S. Padmanaban, A. Sarkar: DSM In India – A strategic and policy perspective [100]
- Jitendra Sood (2010): Demand Side Management in India – Design, Utility based programmes and Super Efficient Appliances [101].
- Forum of Regulators 2008: Report on DSM and Energy Efficiency, Central Electricity Regulatory Commission (CERC), New Delhi [102].
- US-India cooperation on Demand-side Management (DSM): Expanding Maharashtra and Delhi Programs to National-level [104]

The scope specific literature confirm the argumentation in the PoA-DD, in particular the problems associated with demand side management as a new area in India; lack of understanding and expertise in the management and implementation of such large scale programmes using a new untested technology, lack of institutional capacity and finances. The literature shows that DSM initiatives are still in nascent stage, existing initiatives by various DISCOMs 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 barrier demonstrated in an objective manner, that the barrier is real and prevent this type of proposed programme activity.

Managerial Resources

Demonstration of the barrier in the PoA-DD
An energy service company (ESCO) is a private business that engages in a performance-based contract with a client to identify and implement energy- efficiency measures to reduce the client's energy consumption at the client's premises. ESCO's can provide their customer's energy equipment on lease or benefit-sharing terms. ESCO's are considered as an effective mechanism for the introduction of energy efficient equipment, such as LED lighting equipment.

In India the ESCO approach is piloted, but not well established. Currently the barriers for operation of ESCOs in India include:

- Lack of experience as few ESCOs exist ;
- ESCOs have insufficient financial means available ;
- Due to lack of credit history, ESCOs are treated as a high credit risk. This leads to high collateral requirements, which many ESCOs are unable to provide.

If an ESCO is able to overcome the above barriers, there is still difficult to offer lease or benefit-sharing terms to the end-user. In India, asset based lending is the dominant form of lending, whereas LEDs are not considered to be collateral by financing institutions. Reason for this is the fact that the cost of collection of equipment exceeds the value. This lack of collateral will be translated into an interest rate that makes a financial lease unviable or not possible at all.

Assessment of the barrier by SQS
SQS has checked the plausibility of the barrier with the following documentary proof provided by the PPs:

- Okay, N. and Akman, U. (2010): Analysis of ESCO activities using country indicators, in: Renewable and Sustainable Energy Reviews, Volume 14, p.2760-2771 [14].
- 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 [15].
- Statement by financial institution made available to the DOE [12]
- Jackson, J. (2010): Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 (2010), p. 3865-¬-3873. [8]
- REEEP on energy efficiency [9]
- K. Heer (2011): The challenge of up-scaling efficient lighting in the developing world, University of Utrecht [10].
- World Bank (2008): Financing energy efficiency: lessons from Brazil, China, India and beyond [11].
- Ansar, J.and Sparks,R. (2009): The experience curve, option value, and the energy paradox, in: Energy Policy Volume 37, p.1012-¬-1020. [13]
- Vashishtha S. and Ramachandran M. (2006): Multicriteria evaluation of demand side management (DSM) implementation strategies in the Indian power sector, in: Energy, Volume 31, p.2210-¬-2225. [16]

It is SQS' opinion that the documents above are from reputed sources and support the argumentation in the PoA-DD. In order to check the plausibility in the context of India the audit team interviewed representatives of financial institutions, local electricity distribution companies, officials from BEE and LED technology suppliers during the on site visit [86]. The documentary proof as well as the demonstration of the barrier has been cross-checked with scope specific literature:

- Forum of Regulators 2008: Report on DSM and Energy Efficiency, Central Electricity Regulatory Commission (CERC), New Delhi [102].

- Ranjit Bharvirkar, Jayant Sathaye, Amol Phadke (2010): US-India cooperation on Demand-side Management (DSM): Ex-panding Maharashtra and Delhi Programs to National-level [104]

The cross-checks confirm the argumentation in the PoA-DD, in particular the problems associated with lack of experience and insufficient financial means. They state that there is an absence of financial intermediation by banks and other lending institutions to promote and develop energy efficiency lending schemes. The banks and financial intermediates do not have sufficient knowledge and experience with energy efficiency measures. This is resulting in a lack of access to capital for such intiatives/ programmes. The supporting documents also show a relative lack of private sector energy efficiency service delivery mechanisms such as ESCOs and insufficient understanding and assessment of the risks and benefits that accrue to the parties in an energy efficiency transaction.Therefore it is SQS' opinion that the barrier demonstrated in an objective manner, that the barrier is real and prevent this type of proposed programme activity.

Capacity to absorb new technologies

Demonstration of the barrier 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 save energy PoA offers several options to realise a faster roll-out of LED lighting technology (for a detailed list of options, see the section under 'Conclusion on the assessment and demonstration of additionality' below.

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 [7]. 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 [8].
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 [11].
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 [13].

Assessment of the barrier by SQS
SQS has checked the plausibility of the barrier with the following documentary proof provided by the PPs:
- LEDs Magazine Nov. Dec. 2010: LED lighting at the crossroad: country road or express way [7]
- Jackson, J. (2010): Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 (2010), p. 3865-¬-3873. [8]
- World Bank (2008): Financing Energy efficiency: lessons from Brazil, China, India and beyond [11].

It is SQS' opinion that the documents above are from reputed sources and support the argumentation in the PoA-DD. In order to check the plausibility in the context of India the audit team interviewed representatives of financial institutions, local electricity distribution companies and potential end-users during the on site visit [86]. The interviewees confirmed the argumentation in the PoA-DD. Therefore it is SQS' opinion that the barrier

demonstrated in an objective manner, that the barrier is real and prevent this type of proposed programme activity.

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. This scenario faces all the identified barriers: technological barrier & institutional, managerial resources and capacity to absorb new technologies barriers;
- Scenario 3: Programme achieving the same results with a different incentive mechanism. This scenario in principle faces technological, managerial resources and capacity to absorb new technologies barriers.

Scenario 1: 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 India faces a technological barrier & institutional, managerial resources and capacity to absorb new technologies barriers. The registration of LED's save energy PoA under the CDM will enable the establishment and operation of a platform, aimed at enhancing market entry of high quality LED lighting equipment products. The programme will be financed by CER revenues [5, 6]. Alleviation of the barrier is also demonstrated by eligibility criteria N°9 and N°11 where CPA operators have to declare how the CPA will support manufacturers, distributors and end-users to overcome the barriers.The CME plays a crucial role by facilitating access to CER revenues for different manufactures, distributors and project developers to overcome these barriers. This consists of providing the following services:
Professional Monitoring & Verification support; Financing structure (including access to CER revenue via an ERPA with CER buyer(s); Professional scrapping services of old lighting equipment; awareness raising; energy audit; match making and capacity building.

Based on its local, sectoral expertise and assessment, as discussed above, 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.

3.6.5 Common practice analysis

As a plausibility check, the project participants performed a common practice analysis as an additional element. The geographical area of the common practice analysis is the Republic of India. The geographic scope is consistent to the PoA boundary and therefore appropriate.
As correctly indicated in the PoA-DD measure of the PoA is energy efficiency improvement and the output is lighting. PP assessed the LED lighting equipment penetration rate to be below 2% of the total lighting market. This results in a share of LED lighting (F) of 0.02 and can be deemed a marginal proportion of the total market. SQS has checked this factor with a statement of the Electric Lamp and Component Manufacturers Association of India (ELCOMA) [17] and discussed the market share with technology suppliers and officials of BEE. They support the low share of LED lighting in the Indian market. Therefore, the conclusion that the penetration of energy efficient lighting in India is low and more specifically, that LED lighting equipment has hardly penetrated the Indian lighting market, is found to be correct.

SQS performed a research on similar project activities in India. The following implemented programme has been identified:
LED street-lighting pilot programme Kolkata, which is part of The Climate Group's international LightSavers programme, supported by HSBC, and joins 10 other pilots in world cities including Hong Kong, New York, London, Sydney, Tianjin (China), and Toronto [70]. The Kolkata pilot programme targets only street lighting in the area of Kolkata while the proposed CDM PoA involves installation of indoor and outdoor LED lighting equipment

in publicly, commercially, industrially or otherwise employed locations. The PoAs geographic scope and the scope of application are not comparable to the LED street-lighting pilot programme Kolkata.

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, other than CDM project activities, are not already widely observed and commonly carried out in the defined geographic scope. Further, 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.

Prevailing practice/technological 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). Against the background of the National Mission for Enhanced Energy Efficiency (NMEEE), efforts for coordinated national activities on creading and aggregating demand of super efficient equipment (SEE) and a similar concept for promoting LED lights approved by National Manufacturing Competitiveness Council (NMCC) on 19/5/2010 under the framework of the planned Indian Multi-State Regulated Demand Side Managment Programme (RMSDP) SQS raised CAR 16: The PoA DD lacks the quantification of a market penetration threshold above which the prevailing practice/technology barrier no longer applies to CPAs. The CAR has been closed after the CME has updated the PoA-DD by a common practice eligibility check at inclusion of a CPA. A CPA can only be included if the market penetration is below a set benchmark for market penetration. For the LED's save energy 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 common practise.
The threshold of 33% market penetration chosen by the CME is based on Rogers' Innovation-Decision Process Model [105] 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' 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 Save Energy PoA under the CDM will overcome the identified barriers and enable the establishment and operation of a platform, aimed at enhancing 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.

3.7 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.

3.7.1 Values applied of data and parameters monitored by each CPA

Data / Parameter:	**l_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 to be used:	The date is obtained from the applicable local energy distribution company, or equivalent governmental organization.
Value of data applied for the purpose of calculating expected emission reductions in section B.6.1 (CPA-001)	*Ex-ante* estimate: 13%; to be determined ex-post.
Description of measurement methods and procedures to be applied:	THE SSC-CPA's database identify for each LED lighting equipment the relevant distribution company (DISCOM). 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.
QA/QC procedures to be applied:	By using official publications by DISCOMs or official governmental bodies the quality of the value of the data is ensured, as this is the best available source. A CME representative will perform spot-checks on data entries by the CPA-owner in order to minimise data entry errors.
Means of validation:	Reference provided by PP was checked [69] and cross-checked against the original published by MERC [41]. The procedure related to T&D losses in [92] has been checked. Application of the procedure to the CER calculation [97] has been checked. Consistency of parameter description between PoA-DD, specific CPA-DD and generic CPA-DD has been verified.
Findings/ Conclusion PoA-DD	CL 6 was raised: PP was requested to provide evidence from BEE regarding the relative high value of 30% for average annual technical grid losses used in the specific CPA-DD published for global stakeholder consultation. Furthermore the operational manual does not adequately address the technical loss issue at the CPA level. In response to the CL PP clarified that the transmission and distribution losses (T&DL) are to be determined for each LED lighting equipment. There are no Pan India figures for T&DL. In general figures on a state level are available. A procedure to determine the applicable T&DL for each LED lighting equipment has been included in the CME manual (CME/02/25). Furthermore the parameter ly has been moved to Section B.6.1 to allow for monitoring during the crediting period. The procedure in [92] allows the CME to determine the relevant factor for each end user site. Using state specific factors published by the relevant DISCOMs or official governmental bodies is appropriate. 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.
Findings/ Conclusion CPA-001	The first end-user under CPA-001 is located in the state of Maharashtra. For this state the technical transmission and distribution losses for 2011 are determined as 17.28%. The value is correct and supported by evidence [41, 69]. But CPA-DD-001 lists sites in other states than Maharashtra. Thus, using Mahavitaran T&D losses for all sites is not appropriate for the purpose of the CPA-001 ER calculation. CL 6 requested PP to apply the procedure defined in CME/02/25. Furthermore, the CER calculation is based on a l_y value (17.28%) which is only appropriate for the state of Maharashtra (CAR 15). Following CL 6 Project Participants have applied operational procedure CME/02/25. All sites have been assigned to the relevant distribution company (DISCOM). If possible technical grid losses have been identified based on the most recent available published values. References to data sources made available to DOE [96]. The data has been checked and found consistent to those published by the DISCOMs. If it was not possible to establish the technical losses the PPs proposed to use a default value of 10%. Since AMS II-J Demand-side activities for efficient lighting technologies (version04) and AMS II-L Demand-side activities for efficient outdoor and street lighting technologies (version 01) propose to use a default value of 10% in case of unavailable data, it is SQS' opinion that the default value can be considered appropriate to estimate the value of the parameter value *ex-ante*. In response to CAR 15 the CER calculations (and subsequently the specific CPA-DD) have been updated to reflect these changes. CAR and CL closed. It's SQS' opinion that the estimate provided in the specific CPA-DD is reasonable and conservative.

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)	14 280
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. 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 within the metered sampling survey (Smetered,k). That means, if a meter is installed the replaced lamp is collected and stored for verification.
Means of validation:	Interviews during the on-site visits, visit to the first end-user site including interviews with local staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] to ensure monitoring of the parameter has been assessed. SQS checked line diagrams of the first CPA-001 site [54. 58] and assessed its plausibility to be a typical site by checking supporting documents related to the CPA-001 project pipeline [50, 60] and by follow-up interviews.
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 manual [92] 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 the first end-user site times the prospective sites to be included [50, 60] to CPA-001. The number, type an wattage of the lamps to be replaced at the first project site have been inspected during the on-site visit. SQS confirms that the currently installed equipment is real. The calculation of the *ex-ante* estimate of 14,280 for CPA-001 is correctly and transparently presented in the CER calculation sheet [52].The value of the parameter is monitored during implementation (*ex-post*) and will be available after validation; it is SQS' opinion that the estimate provided in the specific CPA-DD for these data and parameters is reasonable and conservative.

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)	*ex-ante* estimate: 14 280; to be determined *ex-post*
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:	Interviews during the on-site visits, visit to the first end-user site including interviews with local staff [72]. Further, an assessment of the appropriateness of the relevant procedures in the CME operational manual [92]. SQS checked line diagrams of the first CPA-001 site [54. 58] and assessed its plausibility to be a typical site by checking supporting documents related to the CPA-001 project pipeline [50, 60] and by follow-up interviews.
Findings/ Conclusion PoA-DD	CAR 2 was raised: There was no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,V13, §17 to allow for neglectance of leakage. In response to CAR 2 the 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/02/12 [92] 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. CAR closed. In addition, the CME management system provides clear definition of roles, responsibilities and duties of entities involved [45; procedure CME 02/05]. CAR 18 was raised because para. 12 of AMS.II.C was not met. The parameter description in the DDs has been amended as per paragraph 12 of AMS II.C. Demand-side energy efficiency activities for specific technologies (v13). 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. CAR closed. 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 manual [92] are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
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 reasonable and conservative.

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)	*ex-ante* estimate: 14 280; to be determined *ex-post*
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:	Interviews during the on-site visits, visit to the first end-user site including interviews with local staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] to ensure monitoring of the parameter has been assessed. SQS checked line diagrams of the first CPA-001 site [54. 58] and assessed its plausibility to be a typical site by checking supporting documents related to the CPA-001 project pipeline [50, 60] and by follow-up interviews.
Findings/ Conclusion PoA-DD	PoA CPA eligibility criteria N°14 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. 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 manual [92] are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
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 (840) times the prospective sites to be included [50, 60] to CPA-001. 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 reasonable and conservative.

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	*ex-ante* estimate: 2 746 000; to be determined *ex-post*

emission reductions in section B.6.1 (CPA-001)	
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:	As per paragraph 12 of AMS II.C. Demand-side energy efficiency activities for specific technologies (v13) 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 (**$S_{metered,k}$**). That means, if a meter is installed the replaced lamp is collected and stored for verification.
Means of validation:	Interviews during the on-site visits, visit to the first end-user site including interviews with local staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] related to this parameter has been assessed. SQS checked line diagrams of the first CPA-001 site [54. 58] and cross-checked Table 5 in the specific CPA-DD against supporting documents related to power of the lamps to be replaced [71, 66, 52, 35]. Please refer to Section 3.5.4 regarding the validation of the procedure for the determination of Greenfield baseline scenario.
Findings/ Conclusion PoA-DD	To the DOE it was unclear (CAR 7) how comparability of service level is ensured for Greenfield activities (which current lamps (with what lumen and watt) would be replaced with what LED lamps (lumen and watt) to ensure compliance with a national standard. It was also unclear what national standards and norms will be applied (CAR 4). PP responded to both CARs that the national lighting code 2010 will be used. It is an official publication of the Bureau of Indian Standards. This Bureau is the national Standards Body of India working under the aegis of Ministry of Consumer Affairs, Food & Public Distribution. The intent of the NLC code is to encourage good lighting practices and systems which would minimize light pollution, glare, light trespass and conserve energy while maintaining safety, security, utility and productivity. SQS' opinion is that the use of the National Lighting Code 2010 as the reference benchmark for illumination levels in India [35] is justified. CAR 4 and CAR 7 closed. As discussed in clause 3.5.4 in this report, the most conservative common practice power of the avoided equipment installed (Greenfield) in the baseline will be determined by the most efficient (watt) available non-LED lighting equipment that would fulfil the service level acc. the NLC standard. 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 kms of the projects boundary; or (b) Within the same city or town jurisdiction. 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. The national standard as well as procedure CME/02/08 to determine service level for Greenfield activities provided in the CME Operation

	Manual [92] are in accordance with EB 61, Annex 21, para 9 and 19 respectively. CAR 18 was raised because para. 12 of AMS.II.C was not met. The parameter description in the DDs has been amended as per paragraph 12 of AMS II.C. Demand-side energy efficiency activities for specific technologies (v13). 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. CAR closed. 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 manual [92] are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/ Conclusion CPA-001	CPA-001 contains brownfield sites only, where high pressure gas discharge lamps such as high pressure mercury vapour lamps are installed. The value of the parameter is estimated by an upscaling of the baseline equipment at the first project site (Navghar Terminal) to the other sites as listed in CPA-DD for CPA-001. The number, type an wattage of the lamps to be replaced at the first project site have been inspected during the on-site visit. SQS confirms that the currently installed equipment is real and its replacement (power/ level of service) is in accordance with the National Lighting Code 2010 [35] and para. 2 of AMS-II.C. By desk review the estimate of the parameter value has been checked with [54, 55, 56, 57, 58, 66 and 71] and found reasonable. The calculation of the *ex-ante* estimate of 2 746 000 W for CPA-001 is correct and transparently presented in the CER calculation sheet [52]. The parameter is monitored during implementation (ex-post) and will be available after validation. In compliance with applicability criterion #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 reasonable and conservative.

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)	*ex-ante* estimate: 1 137 000; to be determined *ex-post*
Description of measurement methods and procedures to be ap-	At the time of installation, the name plate wattage of each installed LED lighting equipment will be recorded.

plied:	
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:	Interviews during the on-site visits, visit to the first end-user site including interviews CME staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] related to this parameter has been assessed. SQS cross-checked Table 5 in the specific CPA-DD against supporting documents related to power of the lamps to be replaced [71, 66, 35].
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. Installation of LED lamps is performed in a way to guarantee that newly installed LED lamps provide the same (or better) light output than the replaced equipment, based on the guidance of the National Lighting Code 2010 [35]. The related procedures, templates and database defined in the CME manual [92] are considered appropriate. Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/ Conclusion CPA-001	SQS confirms that the currently installed equipment is real and its replacement by LED equipment (power/ level of service) is in accordance with the National Lighting Code 2010 [35] and para. 2 of AMS-II.C. The value of the parameter is estimated by an upscaling of the power of the LED lighting equipment to be installed at the first project site (Navghar Terminal) to the other sites as listed in CPA-DD for CPA-001. The calculation of the *ex-ante* estimate of 21,137,000 W for CPA-001 is correctly and transparently presented in the CER calculation sheet [52].The parameter is monitored during implementation (*ex-post*) and will be available after validation; It is SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is reasonable and conservative.

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 outdoor high power (OH) 18 meters
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 “General guidelines for sampling and surveys for small-scale CDM project activity (Version 1)”. The sample size is calculated as 9 samples however in order to be conservative and assure an adequate amount of metered samples the project participants will install for this stratum 18 meters.

QA/QC procedures to be applied:	The CPA owner has to hire an agent apponted 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:	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) and the guidelines for DOEs provided in Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0, EB 69 Annex 5).A detailed description is found below (Chapter 3.7.1 Sampling requirements).
Findings/ Conclusion PoA-DD	CAR 5 was raised regarding the stratified random sampling plan and the calculation of a representative sample size. Resolution of this CAR is described below (please refer to 3.7.1 Sampling requirements). Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/ Conclusion CPA-001	For the stratum 'OH': outdoor high power the overall mean is estimated as 11 hours. The standard deviation is estimated based on the maximum estimated operating hours of 16 h/day and a minimum of 8 hours. This gives an SD of 2 hours/day. The sample size is calculated as 9 samples however in order to be conservative and assure an adequate amount of metered samples the project participants will install for this stratum 18 meters. If LED lighting equipment of the other strata (Outdoor Low-power, Indoor Low-power, Indoor High-power) is installed a new sample size calculations must be made and additional meters are required. CAR 5 was raised regarding the stratified random sampling plan and the calculation of a representative sample size. Resolution of this CAR is described below (Section 3.7.1). It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is reasonable and conservative.

Data / Parameter:	$S_{non\text{-}metered,k}$
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 outdoor high-power (OH) 18 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 "General guidelines for sampling and surveys for small-scale CDM project activity (version 1)".For the stratum 'OH': outdoor high power the overall mean is estimated as 11 hours. The SD is estimated based on the maximum estimated operating hours of 16 h/day and a minimum of 8 hours. This gives an SD of 2 hours/day. The sample size is calculated as 9 samples however in order to be conservative and assure an ade-

	quate amount of non-metered samples the project participants will sample (by survey) for this stratum 18 LED's. The survey will be executed at least once every 6 months.
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. If LED lighting equipment of the other strata (Outdoor Low-power, Indoor Low-power, Indoor High-power) are installed, new sample size calculations must be made.-
Means of validation:	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) and the guidelines for DOEs provided in Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0, EB 69 Annex 5). A detailed description is found below (Chapter 3.7.1 Sampling requirements).
Findings/ Conclusion PoA-DD	CAR 5 was raised regarding the stratified random sampling plan and the calculation of a representative sample size. Resolution of this CAR is described below (please refer to 3.7.1 Sampling requirements). Consistency of parameter between the PoA-DD and CPA-DDs is ensured.
Findings/ Conclusion CPA-001	CAR 5 was raised regarding the stratified random sampling plan and the calculation of a representative sample size. Resolution of this CAR is described below. It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is reasonable and conservative.

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)	*ex-ante* estimate: 11 hours/day; to be determined *ex-post*
Description of measurement methods and procedures to be applied:	Continuous readings of monitoring equipment installed in metered sample group. Sub-populations to be monitored are stratified according to Lamp Classification. Specialised metering equipment is to be installed in monitoring sample group. This equipment will feed monitoring data back to the monitoring entity that digitalised and processes the incoming data and submits these to the CME.
QA/QC procedures to be applied:	All data entry 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 $S_{metered,k}$

Means of validation:	Observations during the on-site visit, interviews with CME staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] related to this parameter has been assessed. SQS checked the calculation of ok_{net} provided in the specific CPA-DD [77, 80] as well as the plausibility of the assumptions. Average operating hours have been checked on plausibility by an enquiry on the meteonorm database. Furthermore SQS has assessed a detailed separate report submitted by PPs on quality assurance and quality control of the operating hours [29].
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 manual [92] 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 (*ex-post*) and will be available after validation. Based on own observations in India, interviews during the on site visit and a plausibility check it is SQS' opinion that the value applied for the purpose of calculating expected emission reductions is reasonable and conservative.

Data / Parameter:	$r_{failure,y}$
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 expected emission reductions in section B.6.1 (CPA-001)	*ex-ante* estimate: 10%; to be determined *ex-post*
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 its 'exact installation location' that is 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 $S_{non\text{-}metered,k}$
Means of validation:	Observations during the on-site visit, interviews with CME staff [72]. Further, the appropriateness of the relevant procedures in the CME operational manual [92] related to this parameter has been assessed by checking the Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0, EB 69, Annex 5). SQS validated the calculation of ok_{net} and $r_{failure,y}$ provided in the specific CPA-DD [77, 80] 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 manual [92] 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 (*ex-post*) 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. CL 1 was raised: The “outage factor” of the old lamps is likely higher than the one monitored for the LEDs (longer lifetime, higher reliability, better warranty due to higher investment costs). How do you ensure that the baseline is conservative (and emission reductions are not overestimated for conventional lamps which would not have been replaced in the baseline scenario)? PP clarified that for Brownfield projects, only existing lighting devices can be replaced. The installed existing lighting equipment can be considered as the minimum lighting service level. While actual lighting demand in most cases supersedes this level. It can be argued that there is a case of suppressed demand. Hence the approach as described in the DD’s will not lead to an overestimation of emission reductions. Furthermore the project participants found that the outage factor was not properly applied to the baseline emission calculations. This has been corrected. CL closed. Based on own observations at the first end user site and a plausibility check CL 3 was raised regarding the outage factor ($of_{k,y}$). The site visit revealed that more than 10% of lamps were broken. How do PP ensure that the option to choose between sample and fixed value is conservative enough and which procedure covers the appropriate rule? The project participants have decided to remove the option to use ‘documented maintenance practices’. It is now only possible to use the default outage factor of 1 month (8.3%). SQS replied that the source of the proposed "default outage factor of 1 month (8.3%)" is unclear. Further, PP were requested again to explain why the default factor is deemed conservative. PP provided a statement of the first end user as evidence [51]. SQS considers the supporting document on the "default outage factor” as not sufficient. In addition PP failed to explain why the proposed outage factor of 1 month (8.3%) is conservative. The PPs clarified that IOT has a maintenance scheme in place, that assures timely replacement of broken lights. Lighting is a security requirement; hence there is a clear incentive to replace the broken lights. In order to ensure a conservative estimation of CERs the project participants will not use the indicated period by IOT for CPA-001, but use the default value. This default outage factor has been increased from one to three months. This implies that if there is an LED failure the LED is replaced within three months. It's SQS' opinion that the estimate provided in the specific CPA-DD for this data parameter is reasonable and conservative.

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

3.7.2 Sampling Requirements

According to EB 69, Annex 4 the proposed sampling plan has been be 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 'General guidelines for sampling and surveys for small-scale CDM project activity (EB 50 Annex 30), and the standard for sampling and surveys for CDM project activities and PoAs (EB 69 Annex 4). As an additional element the PoA-DD refers to 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 EB 69, Annex 4. The specific guideance for DOEs in the Guidelines for sampling and surveys for CDM project activities and programme of activities (version 02.0, EB 69 Annex 5) have been used as reference.

Since the monitoring plan of the LEDs save energy PoA-DD and CPA-DDs did not meet the latest standard for sampling and surveys for CDM project activities and PoAs (EB 69 – Annex 4) CAR 5 was raised. As a result of the CAR the following issues were corrected and/or clarified in the revised 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 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:

- $S_{metered,k}$ 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.
- $S_{non\text{-}metered,k}$ Number of non-metered samples for each stratum installed within a SSC-CPA in order to monitor the mean failure rate ($r_{failure,y}$) 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 (Brown-field) 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 [89] as well as additional guidance in the CME Operational Manual [92] contain the required information regarding sampling design, data to be collected; and implementation plan:

Sampling design
Objectives and Reliability Requirements
The reduction in energy use is the product of the following variables:

(a) difference in wattage between the replaced equipment/avoided equipment and the newly installed LED lighting equipment (based on the nameplate data). This is a point measurement, as it will be recorded once at the actual physical replacement

(b) operating hours of the installed LED lighting equipment. This is a continuous measurement undertaken at the sample group LED lighting equipment.

(c) failure rate of the installed LED lighting equipment. This is a survey conducted on the non-metered sample group LED lighting equipment.

(d) grid emission factor of the country the programme is implemented in. This is a *ex-ante* calculation based on the installed power base. It is not a project-specific variable.

Sampling is necessary to establish variables b and c in the calculation of the reduction in energy use Hence it will result in mean annual values over the crediting period per sampling stratum for:
Lamp operating hours (h); and
Lamp failure rate (%)
The objective of the sampling effort, the timeframe, and the estimated parameter values are sufficiently described in the parameters to be monitored. The sampling requirements are given by the applicable CDM methodology and the guidance provided by EB 50, Annex 30 (SSC CDM project activities) and EB 69, Annex 4 (PoA). 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. 9 EB 69, Annex 4 and best practice examples for sample size calculations in Appendix A to EB 69, Annex 5. Precision is correctly interpretated 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 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 CME operational manual and additional monitoring procedures made available to SQS [92, 29] as well as a supporting document on how samples are to be randomly selected [62]. The monitoring actor will select the LED lighting equipment that is to be metered using statistical software. It will keep a logbook on the random sampling. The basic structure of the logbook is provided to the DOE [61]. Therein it is described how random samples will be selected and representativeness is safe guarded. Representativeness of the population is assured due to 're-distribution' of some of the installed meters. The Procedure for monitoring of the CPAs; under the heading 'random sampling' is described in the CME operational manual [92]. This procedure is applied in supporting document [62]. 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 (21):

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

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. These estimates will be obtained as per Appendix A to EB 69, Annex 5 best practice examples for sample size calculations (stratified random sampling).

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.
A sample size calculation [61] for CPA-001 has been submitted to DOE. Sample size (n) of estimated target number of 14,280 baseline lighting equipment units to be replaced by LED is determined as n=9 for stratum OH. However, in order to be conservative and assure an adequate amount of metered samples the project participants will install for this stratum 18 meters. Based on the Excel sheet and the formulae provided in the PoA-DD SQS was able to reproduce the sample size calculation. If LED lighting equipment of the other strata (Outdoor Low-power, Indoor Low-power, Indoor High-power) are installed a new sample size calculations must be made and additonal meters are required. As it is claerly stated in the PoA-DD the sample size is to be calculated for every stratum of each CPA using the above equation 21 listed in EB 69, Annex 5 (i.e. equation N° 7 of Annex 4 to the PoA-DD and CPA-DD). In accordance with EB 69, Annex 4, para 11 the outcome has been checked using statistical software [98].

SQS deems the sampling design, the sampling frame and the determination of sampling size as appropriate and in accordance withEB 69, Annex 4 and EB 69, Annex 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 entry 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. The CME has provided SQS the procedures to assure representative and conservative results in case of non-responses, data gaps and related issues [29]. The procedures are well defined and provide for minimizing non-sampling errors.

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 (see Figure 5). Each CPA will be sampled individually to prevent statistical bias.

3.7.3 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 data set lowers the margin for er-

rors 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 replaced (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 [92], 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.
- QA/QC procedures for the data measurements are well defined and they adequately provide for minimizing non-sampling errors

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.

3.8 Sustainable development

The PoA contribution to sustainable development in India is confirmed [83] by the LoA of the host party. The authenticity of the Letter of Approval of India is assessed in Chapter 3.1 and deemed genuine.

3.9 Local stakeholder consultation

Local stakeholder consultation is done at PoA level; this is according to EB 55, Annex 38. A local stakeholder consultation was organised on 22 July, 2011 at the Hotel Meluha The Fern in Mumbai, India. The identified stakeholders were invited by personal invitations. The meeting was also advertised in two newspapers: The Economic Times of India and The Times of India [34]. The stakeholder groups which had been identified and were invited, are Indian Government representatives, LED lighting equipment suppliers; financing institutions; energy service companies; local government representatives; End-users of LED lighting equipment; energy distribution companies.
In SQS's opinion, these are the groups affected by the project, and the project participants selected the right groups.
During the 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. Valuable comments were made on the importance of using high quality LED lighting equipment in the programme. The project proponents will take these comments into consideration for the further roll-out of the programme. Documents of the stakeholder consultation [33, 34] were submitted to and assessed by the DOE and deemed as authentic. The choice for PoA level is informed by the fact that all potential installations of LEDs have similar features at national and subnational level. As the distribution of the programme is throughout India, so the stakeholders are also based across India. Therefore, the Local Stakeholder Consultation organised at PoA level has captured all relevant stakeholders.
It is SQS' opinion, that the local stakeholder consultation on PoA level is adequate.

3.10 Global stakeholder consultation

In accordance with paragraph 40 of the Validation and Verification Manual (version 01.2), SQS published the PoA-DD version 2.1 dated 19/12/2011, specific and generic CPA-DDs version 2.0 dated 10/09/2011 on

20/12/2011 for global stakeholder consultation open for comments for 30 days.

The LED's save energy programm of activity received no comments.

3.11 Environmental impacts

The proposed programme of activity involves the distribution and installation of LED lighting equipment. According to the Ministry of Environment and Forests, the host party India does not require an environmental impact assessment for this programme of activity. Also with regard to the CPAs the Indian 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 [31, 32]. A procedure to minimize such potential environmental impacts has been incorporated to the CME operational manual [92]. Procedure CME/02/12 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. Further, it says that the lamps shall be scrapped, in accordance with the approved guidelines of the Ministry of Environment & Forests, applicable at that time [currently 32]. 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 as per the local State Pollution Control Board norms. 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' 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.

3.12 Unique requirements to PoA

3.12.1 Operational and management arrangements for the PoA

Means of validation:
During the on-site visits SQS assessed the management system by interviews and cross-checks. The findings of the on-site visits have been documented [72, 86]. 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 following documents have been reviewed: [44, 45, 46, 79].

CAR 3 was raised regarding CME operational procedures. The procedures do not sufficiently 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. Furthermore, not all forms and fully detailed templates, incl. contractual agreements to be applied in line with the operational procedures to enable DOE's assessment of the management system have been provided. In response to the CAR 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;

CAR closed.

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 [45, CME/02/05].
The CME has defined the following roles for the entities involved under the programme:

Roles under the programme	**Responsibilities**
Coordinating and Managing Entity	• 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	• 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

Roles under the programme	Responsibilities
End-User (s)	• 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 • Use the LED lighting equipment with due care
CER buyer	• Purchase CERs from CPA Owner • Payment of PoA management expenses to CME
Monitoring Role	• 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	• Scrapping of replaced lighting equipment according to CDM rules • Deliver scrapping data to monitoring actor fulfilling this role
Financing Role	• 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 [45, CME/02/22]. Continuous improvement as a concept is incorporated into the CME Manual [45, CME/02/23] based on the corresponding ISO concept. Improvements will be measured by the appropriate ISO standards. Mabanaft Carbon India (the CME) has its own dedicated office in Mumbai and its managing director is in charge of the management system. In order to be able to compile all data within the PoA boundary, the area will be split into 4 geographical regions and subcontractors/representatives will be used. The Monitoring hardware and software will be the same in all geographical areas. 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 this monitoring entity whose name must not be disclosed. 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.
In CL 18 SQS requested a more clearly descriprtion of the roles of entities to be contracted, the responisibility of the CME and its ability to control these entities. PPs clarified that, the operational structure of the programme is described in the PoA-DD Section A.4.4.1. Operational and management plan. In Figure 5 an overview of the different parties involved in the programme is depicted and their respective responsibilities is given in Table 4.

Considering the monitoring party, a competent partner has been identified and discussions for contracting are underway. CME provided the DOE a draft MoU between the CME and the identified monitoring entity [27]. However definite contracting is dependent on succesful registration of the project. The CME will remain involved in the monitoring process, to ensure quality and competitibility of the monitoring results with the rules of the PoA-DD.It is SQS opinion that the arrangements and procedures are sufficient to meet EB 63, Annex 3, para. 9 (a), (b) and (f). CL closed.

CPA Record Keeping
CAR 8 regarding the operational and management plan was raised: The set of forms are incomplete and do not contain all relevant details that allow for direct application and electronic search (e.g. all stratification groups, exact full wording etc.).In response to the CAR the set of forms have been completed. CAR closed.

Each CPA owner is responsible for monitoring the CPA according to the requirements stipulated in methodology AMS.II-C. and the 'LED's Save Energy' 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. The records and documentation control process for CPA-001 under the PoA, made available to the DOE at the time of validation [48, 49, 59]. Furthermore SQS reviewed the CME database operational manual procedures [46]. It is SQS' opinion that the arrangements and procedures are sufficient to meet EB63, Annex 3, para. 9 (e).

CL 13 was requested regarding the unique distinction of future CPAs. PPs referred to procedure CME 01/06 for issue of unique ID for CPA's and updating of CPA list. CL closed. Procedures for technical review of inclusion of further CPAs under the PoA are sufficiently defined in the CME operational manual [92]. The CME has also prepared all forms and templates required by these procedures. It is SQS' opinion that the arrangements and procedures 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 save energy' PoA. All corresponding procedures are defined in the operational manual and have been assessed by SQS.
CL 16 was raised regarding double-counting and debundling. In response to the CL 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 has been added to the operational manual [45, CME/02/16]. CL closed. Double-counting is also considered by PoA eligibility criteria N°2 and N°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/02/16) are sufficient to meet EB 63, Annex 3, para. 9 (d).

A clarification was requested (CL 8) regarding insufficient detail in the CME monitoring procedures. The manual has been updated by a figure showing schematic representation of monitoring processes. Further procedures for QA/QC have been included. CL closed.
In summary SQS concludes that the CME has developed a well documented management system [45, 46] in accordance with the requirements of EB 65, Annex 3, para. 9 (a-f).

3.12.2 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
N°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.
N° 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 [92]. Double-counting is also addressed by criterion N°7 (see below)
N° 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.
N° 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.)?	This criterion ensures that no other technology/ measure will be applied by any CPA operator than those specified in the PoA.
N° 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?	Criterion N° 5 has been added due to CAR 11: Level of service as per EB 65, Annex 3, para 14 (c) was not listed as CPA eligibility criteria. In response to the CAR, level of service considering the applicability of AMS-II.C para. 2 was added as CPA eligibility criteria. CAR closed.
N° 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.
N° 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 management system [92] 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 N°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 N° 2). The system to avoid double-counting has been described in the PoA-DD and the concerned operational manual [92] 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 debundling check will be performed for every CPA in

	accordance with EB 54, Annex 13.
N° 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 [92].
N° 9: Will the CPA meet the requirements pertaining to the demonstration of additionality as specified in the Guidelines on the demonstration of additionality of small-scale project activities (EB 68 Annex 27) Version 9 previously known as Attachment A of appendix B of the "Simplified modalities and procedures for small-scale CDM project activities".	CAR 12 with regard to this eligibility criterion was raised. The criterion was not appropriately formulated to justify the demonstration of additionality of each CPA to be included. In response to the CAR the formulation has been revised. CAR closed. CAR 16 was raised: 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. It is unclear how compliance to criteria 7 will be proven. Particularly with regard to the fact that only one project site is known yet in the first CPA. In response to the CAR the following corrections and clarifications have been provided: Numeration of the criteria has been updated. For eligibility criterion #9 (n°7) on additionality, in Annex 1 of the Template Eligibility Check Report procedure CME/03/16, in the compliance statement required from prospective CPA-owners, an explicit reference has been added to the favourable conditions options specified under point 5 of Annex 2 of CME/03/16, as follows: "(…) as per the favourable conditions specified by prospective CPA-owner under point 5 of Annex 2 of the latest version of CME procedure CME/03/16". This means 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.SQS accepted the amendment. The Eligibility Check Report of CPA-001 [106] provided to the DOE demonstrates the usability of this criterion.
N° 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 has been revised (CAR 16) to include the requirement of a signed statement (based on the template provided in CME procedure CME/03/26) 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 save energy, 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 party [103].
N° 11: Is the market penetration of LED lighting in India below 33% at the time of inclusion of the CPA?	Against the background of the National Mission on Enhanced Energy Efficiency (NMEEE) and associated intiatives to creat and aggregate LED diffusion SQS requested the CME to address the eligibility of future CPAs under the PoA by a common practice criterion. The eligibility criteria ensures that no CPA will be included to the PoA if LED market penetration is above 33%.
N° 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.

N° 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 retest the validity of assumptions made in the PoA-DD.
N° 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' (Version 02.0), EB 65, Annex 2?	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.
N° 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.
N° 16 Is the SSC-CPA approved by the CME and the DOE prior to its incorporation into the PoA?	This criterion ensures that no CPA will included to the PoA without prior approval by the CME and a DOE.
N° 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 EB 68, Annex 27. The CME operational manual defines all procedures, forms and templates [92] 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.

3.12.3 Validation of the specific CPA (CPA-001)

According VVM. 1.2 para 168 SQS has assessed the specific CDM SSC CPA-DD (CPA-001) [74, 77, 80], which the project participants submitted together with the CDM-SSC- PoA-DD [73, 76, 79] 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).
- Two on-site visits between 25-27 July, 2011 and 19-20 December, 2011 respectively (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.

CAR 14 regarding the eligibility of the CPA-001 was raised: There was no verifiable justification made available to SQS to determine whether the small-scale specific CPA is eligible to be included under the PoA or not. SQS stated that CPA-001 (specific CDM-SSC-CPA-DD version 2.1 [74]) is based on a rather hypothetical scenario than a real case. Thus, SQS was not able to check eligibility of the proposed first CPA. In response to the CAR the text of the specific CDM-SSC-CPA-DD (CPA-001) has been revised [80] to make it more specific to include only real sites that are owned, managed, operated or built by IOT [50, 60]. Furthermore it has been included that only Brownfield locations can be included under CPA-001. The description of the revised specific CPA-DD and the supporting documents have been assessed by the DOE [24, 28, 80, 51, 52, 54-58, 59, 60]. It is SQS opinion that the description of CPA-001 in its final version is based on a real case. CAR closed.

CAR 17 was raised: Compliance with the PoA eligibility criteria has not been documented in the specific CDM-SSC-CPA-DD [74]; Further, SQS misses the results of the assessments or other verifiable documents. In response to the CAR and CAR 14 discussed above, PPs revised the CPA-DD and submitted inter alia the eligibility check report of CPA-001 [106]. The information provided is deemed sufficient to assess the eligibility of CPA-001 with the PoA. CMEs eligibility check report of CPA-001 is deemed complete. CAR closed.

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	List of IOT end-user sites to be included to CPA-001 [50, 60]. Eligibility Check Report of CPA-001 [106]	OK. The sites as listed in the specific CDM-SSC-CPA-DD and 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	List of IOT sites [60], procedures and CPA database templates related to the unique identification of end-users [92]. Eligibility Check Report of CPA-001 [106]	OK. The information provided and the CPA record keeping system reviewed on-site 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	CER-waiver signed by IOT [48]	CL 10 was raised: The CME operational procedures include a template for the waiver of CERs (CME/01/18). The reference number is wrong. Evidence for the waiver of CERs for CPA-001 cannot be found. In response to the CL the waiver template was included in the CME operational manual [92]. The signed CER waiver from the first foreseen end-user under CPA-001 has been added as supporting document [48]. CL closed. Thus, information provided is sufficient to determine that CPA-001 is compliant 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	Eligibility Check Report of CPA-001 [106], project description in the specific CPA-DD [90]	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	Eligibility Check Report of CPA-001 [106]; line diagrams [54-58], Quotation LED lamps [22], National Lighting Code [35].	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	Eligibility Check Report of CPA-001 [106]	OK, Since no LED equipment has been ordered yet, evidence is not available. Starting date of the first CPA has been checked by a follow-up interview. It is after the start date (01/07/2011) of the validation of the PoA.
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	CME debundling check included to [106], confirmation signed by CPA-001 owner, Mabanaft India Pvt. Ltd.	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
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	Eligibility Check Report of CPA-001 [106], supporting documents to the specific CDM-SSC-CPA-DD [40, 41, 42, 50, 51, 54-58, 60]	CAR 15 with regard to the estimated emission reduction was raised: CER calculation [42] does not consider the assignment of the projected IOT sites to the relevant grid as per Annex 3 to the CPA-DD and the procedure defined in CME/02/24. Furthermore, the CER calculation is based on a l_y value (17.28%) which is only appropriate for the state of Maharashtra. Resolution of this CAR is discussed in clause 3.7.1.

9	Will the CPA meet the requirements pertaining to the demonstration of additionality as specified in Guidelines on the demonstration of additionality of small-scale project activities (EB 68 Annex 27) previously known as Attachment A of appendix B of the "Simplified modalities and procedures for small-scale CDM project activities.	YES	Eligibility Check Report of CPA-001 [106], specific CPA-DD [90]	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion. In order to alleviate the barriers the following measures are going to be promoted to end-users: Awareness raising, information dissemination, Matchmaking with appropriate technology provider, Capacity building at the end-user, Support with identification of financing options
10	Does the CPA rule out include facilities that are covered by an enforced government policy which includes mandatory adoption of LED lighting equipment?	YES	End-user Declaration on no Government policy LED lighting [59]	Declaration was requested due to CAR 16. SQS assessed the End-user Declaration on no Government policy LED lighting [59]. It declares that the IOT as end-user is not covered by an enforced government policy that includes mandatory adoption of LED lighting equipment. The assessed declaration is written and signed 21/02/2012 by a senior representative of IOT Navghar oil terminal near Mumbai. As verified on site this is the first end-user site under CPA-001. CAR closed. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion

11	N° 11: Is the market penetration of LED lighting in India below 33% at the time of inclusion of the CPA?	YES	Statement by ELCOMA, the Electric Lamp and Component Manufacturers' Association of India [17] says that " LED has hardly penetrated in India. It can't be more than 2% at present". Eligibility Check Report of CPA-001 [106]	OK. SQS has assessed the email correspondence between ELCOMA [17] and CME. SQS has - based on ELCOMA data from the Lighting Industry in India -calculated the following market shares of different types of lamps sold in India in 2010: Incandescent lamps: 62%; Fluorescent lamps 14% and CFL lamps 23%. Against the background of the consumer prices of incandescent lamps 10-12 Rs/p, fluorescent lamps 50-90 Rs/p and CFL lamps 80-250 Rs/p [17] it is unlikely that the market share of LED (1000+ Rs/p) has significantly increased in the last two years. Thus, a market penetration of LED below 2% is reasonable. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
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	Eligibility Check Report of CPA-001 [106]	OK. The information provided is sufficient to determine that CPA-001 is compliant 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	Eligibility Check Report of CPA-001 [106]	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' (Version 02.0), EB 65, Annex 2?	YES	Eligibility Check Report of CPA-001 [106], specific CPA-DD [90]	CPA-001 complies with the sampling requirements as per the sampling plan of the PoA, in accordance with EB 69, Annex 4. Validation of the sampling plan is discussed in clause 3.7.2.
15	Will the energy savings be capped at 60 GWh/per year?	YES	Eligibility Check Report of CPA-001 [106], specific CPA-DD [90], CER calculation [42]	OK. The information provided is sufficient to determine that CPA-001 is compliant with the eligibility criterion.
16	Is the SSC-CPA approved by the CME and the DOE prior to its in-corporation into the PoA?	YES	Eligibility Check Report of CPA-001 [106]	OK, CPA-001 has been approved by the CME on 23.05.2012. DOE's validation opinion regarding CPA-001 is part of this validation report.
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?	YES	Eligibility Check Report of CPA-001 [106]	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-DD. Hence, SQS confirms the eligibility of CPA-001 to the PoA. Other validation findings and conclusions related to CPA-001 project description, baseline and monitoring are to be found in the relevant section of this report.

3.13 Validation protocol

In order to ensure transparency and organize the corrective or additional information and measures a 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
Michael Gassner	LA	Switzerland	X		X	X		
Martin Enderlin	TM	Switzerland	X	X				
Zsolt Lengyel	TM	Switzerland		X				
Margit Haberreiter, PhD	TM	Switzerland					X	
David Gazdag	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: On-Site Visit Programme and Interviewees

Time from	to	Topic	Function/Department	Interview partner(s)
25.7.2011				
10.00	12:00	First CPA set up (details, barriers, financials)	Joshi Electronics & Electricals, Mumbai (Metering, also small LED producer)	Mr. Makarand Joshi, Owner
12:00	13:00	Generic / next CPA set up (financial details, barriers, financials)	Bajaj Electrical Limited, Mumbai (LED supplier)	Mr. C.G.S. Mani, President – lighting,
17.00	17:100	First CPA set up (financial details, barriers, financials) (finance – LED collateral)	Yes Bank, Mumbai	Tel. call with Mr. XY, No interest even to talk or meet.
18:15	20.15	First specific CPA set up (financial details, barriers, financials)	Indian Oiltanking Infrastructure & Energy Services Limited, Mumbai	Mr. N.S. Venkataram, Senior Vice President (Operations)
21:00	22:00	CME - PoA & CPA setup (policies, details, barriers, financials, & open issues of the day)	Mabanaft Carbon Private Limited India	Mr. GP Aggarval
26.7.2011				
10:15	11:15	Generic / next CPA set up (financial details, barriers, financials)	Reliance Energy, Mumbai (local grid operator)	Mr. Rakseh Raj, Deputy General Manager; Swapna Nigaly, Manager (demand side management)
14.30	15:30	First CPA set up (financial details, barriers, financials) (finance – LED collateral) nr. 8 file(full credit appraisal, due diligence and adequate legal documentation)	Rabo India Finance, Mumbai	Mr. Amardeep Parmar, Director & Head renewable Energy and Infrastructure Finance; Mr. Prateek Bajaj, Senior manager, renewable Energy and Infrastructure finance,
16:00	16:30	PoA & CPA setup (policies, details, barriers, and financials)	Crompton Greaves (engineering cooperation), Mumbai	Mr. Swarloop Bolar, Assistant General Manager - Marketing Lighting Division
17:00	18:00	CME PoA & CPA setup (policies, details, barriers, financials, & open issues of the day)	Mabanaft Carbon Private Limited India	Mr. GP Aggarval

27.7.2011				
9:45	11:30	PoA setup (policies, details, barriers, financials, GEF)	Bureau of Energy Efficiency (BEE), Delhi	Mr. Srinivasan Ramaswamy, Senior technical expert; Mr. Manu Maudgal, technical expert
12:10	13:10	PoA setup (policies, grids and GEF)	ELCOMA (light manufacturer association), Delhi	Mr. Shyam Sujan, Secretary General; H.S. Mamak, Advisor
15:00	15:30	PoA & CPA setup (policies, details, barriers, and financials)	Asian Electronic Ltd (AEL) (Escom & small HQ LED producer)	Telephone interview with Mr. Devender Kaushik, Asst. General Manager
17:30	19:30	CME PoA & CPA setup (policies, details, barriers, financials, Operational Manual & open issues of the day)	Mabanaft Carbon Private Limited India	Mr. GP Aggarval
n.a.	n.a.	PoA setup (policies, details, barriers, financials, GEF)	DNA, Delhi	(difficult to get)

Programme of the on site visit by Mr Martin Enderlin, SQS.

Time				
from	to	Topic	Function/Department	People to be interviewed
19.12.2011				
09:00	12:00	PoA & CPA all issues for which the CME responsible for	Mabanaft Carbon Private Limited India (the CME of the project) (1) Indian Oiltanking Infrastructure & Energy Services Limited, (IOT) Mumbai (2)	Mr. GP Aggarval, Managing Director (1) Mr. Beer Ali, Managing Director (2) Mr Raj Kumar, Finance Manager (1)
13:00	15.30	1st CPA set up	Mabanaft Carbon Private Limited India (the CME of the project) (1) Indian Oiltanking Infrastructure & Energy Services Limited (IOT), Mumbai	Mr. GP Aggarval, Managing Director (1) Mr. Beer Ali, Managing Director (2)
15.30	17.00	PoA & 1st CPA monitoring, replacement/scrapping & training for third parties on these subjects	Joshi Electronics & Electricals, Mumbai (1) Mabanaft Carbon Private Limited India (the CME of the project) (2)	Mr. Makarand Joshi, Owner & Managing Director (1) Mr. GP Aggarval, Managing Director (2)

Programme of the second on site visit by Mr Zsolt Lengyel, SQS.

8 Appendix B: Follow Up Interviews

20/02/2012		
Name	**Position**	**Issue**
Edwin Dalenoord	Founding partner, Do-Inc	Project boundary, eligibility of CPA-001 Eligibility of CPA-001
Lucas Koolschijn	Do-Inc	
Patricia Rosenthal	Business Development Manager Mabanaft	

26/03/2012		
Name	**Position**	**Issue**
Edwin Dalenoord	Founding partner, Do-Inc	Sampling plan
Lucas Koolschijn	Do-Inc	

9 Appendix C: Documents Reviewed

[Ref. Nr.]	Doc.Title	Author	Version
1	11th Five Year Plan (2007--2012) of the Indian Government Volume 1	Planning Commission, Government of India	unedited
2	Guide to Energy--Efficient Lighting	U.S. Department of Energy	Oct. 2011
3	Report on the 17th Electric Power Survey of India	CEA, India	May 2007
4	Installed Generation Capacity, Monthly Report, April 2011	CEA, India	April 2011
5	100329_Quick_Scan_LED_Mabanaft	Mabanaft	2011
6	100929_Business_Development_Strategy_LED	Mabanaft	2011
7	LED lighting at the crossroads: country road or expressway?, in: LEDs Magazine (November/December 2010) p.31–34.	Wunderlich, F.et al.	2010
8	Promoting energy efficiency investments with risk management decision tools, in: Energy policy, Volume: 38 (2010), p. 3865--3873.	Jackson, J.	2010
9	REEEP on energy efficiency	REEEP	unedited
10	The challenge of up-scaling efficient lighting in the developing world. Master Thesis	Katrin Heer	2011
11	Financing Energy efficiency: lessons from Brazil, China, India, and beyond	World Bank	2008
12	Statement by Rabobank	Rabobank	2011
13	The experience curve, option value, and the energy paradox, in: Energy Policy Volume 37 (2009) p.1012--1020.	Ansar, J.and Sparks,R.	2009
14	Analysis of ESCO activities using country indicators, in: Renewable and Sustainable Energy Reviews, Volume 14 (2010) p.2760--2771.	Okay, N. and Akman, U.	2010
15	Promoting energy efficiency financing and ESCOs in developing countries: mechanisms and barriers, in: Journal of Cleaner Production, Volume 11 (2003) p.659--665.	Painuly, J.P. et al.	2003
16	Multicriteria evaluation of demand side management (DSM) implementation strategies in the Indian power sector, in: Energy, Volume 31 (2006), p.2210--2225.	Vashishtha S. and Ramachandran M.	2006
17	Statement by ELCOMA, the Electric Lamp and Component Manufacturers' Association of India (email correspondence 5th May 2011).	ELCOMA	2011
18	Strategies Unlimited report LED Luminaires, Market Analysis and Forecast	Strategies Unlimited	2nd Edition, February 2011
19	CO2 Baseline Database for the Indian Power Sector	CEA, India	6.0, May 2011
20	Grid Emission Factor calculation sheet (Excel)	CEA, India	2011
21	Information on Grid Transmission and Distribution losses	CEA, India	2011
22	Quotation_LED_Lamps_AEL	AEL	2011
23	CER estimation calculations sheet (Excel)	Do-Inc.	2011
24	Information IOT	IOT	2011
25	Termsheet between Mabanaft Carbon B.V. and Mabanaft Carbon India	CME	2011
26	Draft MoU between CME Mabanaft Carbon India Private Ltd and monitoring actor Joshi Electronics for whole PoA	CME	2011
27	Draft MoU between CPA--001 owner Mabanaft Carbon India Private Ltd. And monitoring actor Joshi Electronics for CPA-001	CME	2011
28	MoU between Mabanaft Carbon India and IOT	CME	2011
29	Monitoring overview document Joshi Electronics	Joshi Electronics	2011

30	CME operational procedures	CME	2011
31	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.	Lim, S. R. et al.	2011
32	Guidelines for environmentally sound mercury management in the fluorescent lamp sector	Central Pollution Control Board, Ministry of Environment and Forests	November 2008
33	Meeting key stakeholders site visit India	CME	2011
34	Stakeholder Consultation Report	CME	2011
35	National Lighting Code (NLC)	Bureau of Indian Standards	2010
36	CEA_user_guide_ver6	CEA, India	version 6
37	Updated CER calculations	Do-Inc.	2011
38	Modalities of Communication	CME	2011
39	Monitoring_Software	CME	2011
40	Delineation_Southern_Grid	CEA	2011
41	Mahavitaran_Transmission_and_Distribution_losses	Maharashtra Electricity Regulatory Commission (MERC)	2011
42	LEDs_Save_Energy_updated_CER_estimation_calculation	Do-Inc.	2012
43	MoC_LEDs_save_energy	CME	
44	CME_Operational_Manual_v_2_0	CME	Version 2.0, 2012
45	CME_Operational_Manual_v_3_0	CME	Version 3.0, 2012
46	Database_CME_operational_manual_procedures_v_1_0	CME	Version 1.0, 2012
47	LED_Luminaires_report_2_p95_p187	Strategies Unlimited	2011
48	Waiver_CERs_signed	IOT	2012
49	CPA-001_Eligibility_Check_Report	CME	2012
50	IOT_pipeline_small_slide_5	IOT	2012
51	Outagefactor	IOT	2012
52	CER_calculation_final	Do-Inc.	17.10.2012
53	Baseline_Carbon_Dioxide_Emission_database_Version_7_0	CEA, India	Version 7.0
54	Line_diagram_lighting_Navghar_terminal_drawing_054_1	IOT	unedited
55	Line_diagram_lighting_Navghar_terminal_drawing_054_2	IOT	unedited
56	Line_diagram_lighting_Navghar_terminal_drawing_055	IOT	unedited
57	Line_diagram_lighting_Navghar_terminal_drawing_059	IOT	unedited
58	Line_diagram_lighting_Navghar_terminal_drawing_062	IOT	unedited
59	Enduser_Declaration_on_no_Government_policy_LED_lighting	IOT	2012
60	IOT_sites	IOT	2012
61	Sample_size	Do-Inc.	2012
62	Random_sample_selection	Do-Inc.	2012
63	Transmission and Distribution in India, a report	WEC-IMC and Power Grid Corporation of India Limited	2010
64	Indian Buereau of Energy Efficiency. (http://www.beeindia.in/)	BEE	2012
65	Common Light Measurement Terms http://www.ledtronics.com/TechNotes/TechNotes.aspx?id=13	LEDtronics	2012
66	Lighting Retrofit and Relighting: A Guide to Energy Efficient Lighting, John Wiley and Sons. Inc, New Jersey, 2011	Benya J., Leban D.	2011
67	University of Pittsburgh (2010): LED streetlights best buy for cities, researchers report. ScienceDaily. Retrieved March 7, 2012,	University of Pittsburgh	2010
68	LED Street Lighting,Host Site: City of San Francisco, California. Final Report prepared in support of the U.S. DOE Solid-State	U.S. Department of Energy	2008

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69	http://www.caclubindia.com/reader/power-distribution-utility-mahavitaran-reports-distribution-losses-3094.asp#.TwHCQ5hkWFZ	Maharastra state	
70	http://www.ledsmagazine.com/news/7/11/20		18.11.2010
71	The International Energy Agency (2006) provides an average luminous efficiency of 23-60 lumen per Watt for high pressure mercury vapour lamps http://www.iea.org/Textbase/npsum/Light2006SUM.pdf).	IEA	2006
72	LEDs save energy OSV findings LEZ 2012 01 02	M. Gassner, Z. Lengyel	unedited
73	SSC PoA-DD LED's save energy (19.12.2011)	CME, Do-Inc.	Version 2.1
74	SSC CPA-DD specific LED's save energy (10.09.2011)	CME, Do-Inc.	Version 2.0
75	SSC CPA-DD generic LED's save energy (10.09.2011)	CME, Do-Inc.	Version 2.0
76	SSC PoA-DD LED's save energy (06.01.2012)	CME, Do-Inc.	Version 3.0
77	SSC CPA-DD specific LED's save energy (06.01.2012)	CME, Do-Inc.	Version 3.0
78	SSC CPA-DD generic LED's save energy (06.01.2012)	CME, Do-Inc.	Version 3.0
79	SSC PoA-DD LED's save energy (23.02.2012)	CME, Do-Inc.	Version 4.0
80	SSC CPA-DD specific LED's save energy (23.02.2012)	CME, Do-Inc.	Version 4.0
81	SSC CPA-DD generic LED's save energy (23.02.2012)	CME, Do-Inc.	Version 4.0
82	Dutch_LoA 2011ANL506 signed 15/09/2011	DNA of the Netherlands	15.09.2011
83	Indian LoA No: 4/10/2012-CCC	National CDM Authority	12.10.2012
84	Dutch LoA 2012ANL648 signed 18/07/2012	DNA oft he Netherlands	18.07.2012
85	Overview of issued Written Approvals for participation in a CDM project Activity (accessed 17.10.2012), pdf file	DNA of the Netherlands	17.10.2012
86	Memo onsite visit SQS LED	Do-Inc.	July 2011
87	Regional Energy Efficiency Needs in Lighting Initiatives by Bureau of Energy Efficiency	BEE	Jan. 2011
88	Transmission Network of India (>200kV , >400 kV (http://cbip.org/power_map.html)	Central Board of Irrigation and Power	2012
89	SSC PoA-DD LED's save energy (final version, 17.10.2012)	CME, Do-Inc.	Version 5.3
90	SSC CPA-DD specific LED's save energy, CPA-001 (final version, 17.10.2012)	CME, Do-Inc.	Version 5.3
91	SSC CPA-DD generic LED's save energy (final version, 17.10.2012)	CME, Do-Inc.	Version 5.3
92	CME_Operational_Manual_v_4_1	CME	Version 4.1,
93	AMS.II-L	CDM EB 60	Version 1.0
94	CPA001_PROCEDURE TO DETERMINE THE RELEVANT GRID EMISSION FACTOR FOR LED LIGHTING EQUIPMENT_CME_24	Do-Inc.	unedited
95	CPA-001 End-user Declaration on no Government policy	IOT	09.04.2012
96	PROCEDURE TO DETERMINE THE TRANSMISSION AND DISTRIBUTION LOSSES FOR LED LIGHTING EQUIPMENT_CME_25	Do-Inc.	unedited
97	CER_Calculation final	Do-Inc.	17.10.2012
98	Statistical software: www.raosoft.com/samplesize.html	Raosoft	unedited
99	DSM Information Hub, Finance, Bureau of Energy Efficiency (http://220.156.189.26/Finance.aspx)	BEE	2012
100	DSM In India – A strategic and policy perspective (http://www..energymanagertraining.com%2FDSM%2FElectricityDemandSideManagement.doc&ei=sivoT6iKB4GY-wbvwe2wAw&usg=AFQjCNGPzQk93As2XaUg6v5LoF0wtoaKOg)	S. Padmanaban, A. Sarkar	unedited
101	Demand Side Management in India – Design, Utility based programmes and Super Efficient Appliances. 3rd Capacity Building	Jitendra Sood (BEE)	2010

	Programme for Officers of Electricity Regulatory Commissions (http://www.iitk.ac.in/ime/anoops/for10/pdf/9%20-%20Jitendra%20Sood%20-%20Designing%20DSM%20and%20Utility%20Energy%20Efficiency%20Programs.pdf)		
102	Formum of Regulators: Report on DSM and Energy Efficiency, Central Electricity Regulatory Commission, New Delhi. (http://www.forumofregulators.gov.in/Data/HomePage/FOR%20Report%20on%20DSM%20&%20Energy%20Efficiency-11.11.2008.pdf)	CERC	2008
103	Sustainable Energy Regulation Network: Policy and Regulatory Review, Special Report on India and Indian States.	SERN/ REEEP	2009
104	US-India cooperation on Demand-side Management (DSM): Expanding Maharashtra and Delhi Programs to National-level, Lawrence Berkeley National Laboratory	Ranjit Bharvirkar, Jayant Sathaye, Amol Phadke	2010
105	Rogers, E.M. (1995): Diffusion of Innovations. 3rd Edition. Rev. Edition of: Communication of innova-tions. The Free Press, New York	Everett Rogers	1995
106	Revised Eligibility Check Report CPA-001	CME	23.05.2012
107	121019 signed MoC LED's save energy.pdf	PPs, signed 26.07.2012	19.10.2012

10 Appendix D: Certificates of Competence

Name: Mr Michael Gassner

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	□
	TA 1.2: Energy generation from renewable energy sources	x
2	Energy distribution	□
	TA 2.1: Electricity distribution	□
	TA 2.2: Heat distribution	□
3	Energy demand	□
	TA 3.1 Energy demand	□
4	Manufacturing industries	□
	TA 4.1: Cement sector	□
	TA 4.2: Aluminium	□
	TA 4.3: Iron and steel	□
	TA 4.4: Refinery	□
5	Chemical industry	□
	TA 5.1: Chemical process industries	□
6	Construction	□
	TA 6.1: Construction	□
7	Transport	x
	TA 7.1: Transport	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	□
9	Metal production	□
	TA 9.1: Metal production	□
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	□
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	□
12	Solvents use	□
	TA 12.1: Chemical process industries	□
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	□
	TA 14.1: Forestry	□
15	Agriculture	x
	TA 15.1: Agriculture	x
	TA 15.2: Animal waste management	x

Name: Mr Martin Enderlin, PhD

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	x
	TA 1.2: Energy generation from renewable energy sources	x
2	Energy distribution	x
	TA 2.1: Electricity distribution	☐
	TA 2.2: Heat distribution	x
3	Energy demand	x
	TA 3.1 Energy demand	x
4	Manufacturing industries	☐
	TA 4.1: Cement sector	☐
	TA 4.2: Aluminium	☐
	TA 4.3: Iron and steel	☐
	TA 4.4: Refinery	☐
5	Chemical industry	☐
	TA 5.1: Chemical process industries	☐
6	Construction	☐
	TA 6.1: Construction	☐
7	Transport	x
	TA 7.1: Transport	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	☐
9	Metal production	☐
	TA 9.1: Metal production	☐
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	☐
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	☐
12	Solvents use	☐
	TA 12.1: Chemical process industries	☐
13	Waste handling and disposal	x
	TA 13.1: Waste handling and disposal	x
	TA 13.2: Animal waste management	☐
14	Afforestation and reforestation	☐
	TA 14.1: Forestry	☐
15	Agriculture	☐
	TA 15.1: Agriculture	☐
	TA 15.2: Animal waste management	☐

Name: Mr Zsolt Lengyel

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	☐
	TA 1.2: Energy generation from renewable energy sources	x
2	Energy distribution	x
	TA 2.1: Electricity distribution	☐
	TA 2.2: Heat distribution	x
3	Energy demand	x
	TA 3.1 Energy demand	x
4	Manufacturing industries	☐
	TA 4.1: Cement sector	☐
	TA 4.2: Aluminium	☐
	TA 4.3: Iron and steel	☐
	TA 4.4: Refinery	☐
5	Chemical industry	☐
	TA 5.1: Chemical process industries	☐
6	Construction	☐
	TA 6.1: Construction	☐
7	Transport	☐
	TA 7.1: Transport	☐
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	☐
9	Metal production	☐
	TA 9.1: Metal production	☐
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	☐
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	☐
12	Solvents use	☐
	TA 12.1: Chemical process industries	☐
13	Waste handling and disposal	x
	TA 13.1: Waste handling and disposal	x
	TA 13.2: Animal waste management	☐
14	Afforestation and reforestation	☐
	TA 14.1: Forestry	☐
15	Agriculture	☐
	TA 15.1: Agriculture	☐
	TA 15.2: Animal waste management	☐

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	☐
2	Energy distribution	☐
	TA 2.1: Electricity distribution	☐
	TA 2.2: Heat distribution	☐
3	Energy demand	☐
	TA 3.1 Energy demand	☐
4	Manufacturing industries	☐
	TA 4.1: Cement sector	☐
	TA 4.2: Aluminium	☐
	TA 4.3: Iron and steel	☐
	TA 4.4: Refinery	☐
5	Chemical industry	x
	TA 5.1: Chemical process industries	x
6	Construction	☐
	TA 6.1: Construction	☐
7	Transport	☐
	TA 7.1: Transport	☐
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	☐
9	Metal production	☐
	TA 9.1: Metal production	☐
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	☐
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	☐
12	Solvents use	x
	TA 12.1: Chemical process industries	x
13	Waste handling and disposal	☐
	TA 13.1: Waste handling and disposal	☐
	TA 13.2: Animal waste management	☐
14	Afforestation and reforestation	☐
	TA 14.1: Forestry	☐
15	Agriculture	☐
	TA 15.1: Agriculture	☐
	TA 15.2: Animal waste management	☐

Name: Mr David Gazdag

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	☐
2	Energy distribution	☐
	TA 2.1: Electricity distribution	☐
	TA 2.2: Heat distribution	☐
3	Energy demand	x
	TA 3.1 Energy demand	x
4	Manufacturing industries	☐
	TA 4.1: Cement sector	☐
	TA 4.2: Aluminium	☐
	TA 4.3: Iron and steel	☐
	TA 4.4: Refinery	☐
5	Chemical industry	☐
	TA 5.1: Chemical process industries	☐
6	Construction	☐
	TA 6.1: Construction	☐
7	Transport	☐
	TA 7.1: Transport	☐
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	☐
9	Metal production	☐
	TA 9.1: Metal production	☐
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	☐
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	☐
12	Solvents use	☐
	TA 12.1: Chemical process industries	☐
13	Waste handling and disposal	☐
	TA 13.1: Waste handling and disposal	☐
	TA 13.2: Animal waste management	☐
14	Afforestation and reforestation	☐
	TA 14.1: Forestry	☐
15	Agriculture	☐
	TA 15.1: Agriculture	☐
	TA 15.2: Animal waste management	☐

11 Appendix E: Abbreviations

BEE	Bureau of Energy Efficiency (India)
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority (India)
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification Request
CME	Coordinating or Managing Entity
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DISCOM	Distribution Company
DNA	Designated National Authority
DSM	Demand Side Energy Management
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_2O	Nitrous oxide
NCL	National Lighting Code (India)
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operational Manual
PoA	Programme of Activity
SQS	Swiss Association for Quality and Management Systems
UNFCCC	United Nations Framework Convention on Climate Change

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Appendix F: CDM PoA/CPA Validation Protocol

Enterprise

Business account:	322860
Company:	Mabanaft
Address:	Ruben Benders Head - Global Carbon Markets Wilhelminakade 101 (43rd floor) NL-3072 AP Rotterdam
Phone:	+31 10 - 290 69 43
Fax:	+31 10 - 411 07 53
E-Mail:	ruben.benders@mabanaft.nl
0	Mr Ruben Benders /

Contact person:

Service

Audit/Assessment:	CDM PoA Validation
Audit/Assessment beginning/end:	19/12/2011 – 30/10/2012
Project name:	LED's save energy
GBZ/Report-No.:	322940/P31377.33
UNFCCC Scope(s)/Technical area(s):	SS 3. Energy Demand / TA 3.1 Energy Demand
UNFCCC Methodology:	AMS.II-C ver. 13
UNFCCC Scale:	Small (SSC)
Team of auditors/assessors:	Mr Michael Gassner Mr Martin Enderlin Mr Zsolt Lengyel Ms Margit Haberreiter

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Introduction

Objective of CDM Validation ([1] 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.

Requests ([1] 35-37)

- The DOE shall raise a corrective action request (CAR) if one of the following occurs:
  (a) The project participants 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;
  (c) There is a risk that emission reductions cannot be monitored or calculated.
- 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.
- 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

No.	*Title*
1	THE CLEAN DEVELOPMENT MECHANISM VALIDATION AND VERIFICATION MANUAL (VERSION 1.2)
2	AMS-II.C. DEMAND-SIDE ENERGY EFFICIENCY ACTIVITIES FOR SPECIFIC TECHNOLOGIES (VERSION 13)
3	DECISIONS AND SPECIFIC GUIDANCE ISSUED BY THE CDM EB PUBLISHED UNDER HTTP://CDM.UNFCCC.INT
4	GLOSSARY OF CDM TERMS (VERSION 06)
5	GENERAL GUIDELINES TO SSC CDM METHODOLOGIES (VERSION 17)
6	GUIDELINES ON THE DEMONSTRATION OF ADDITIONALITY OF SMALL-SCALE PROJECT ACTIVITIES (EB 68 ANNEX 27)
7	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)
8	ELIGIBILITY OF ACTIVITIES UNDER THE CDM (EB 33 PARA. 30)
9	GUIDANCE ON PROGRAMME OF ACTIVITIES (POA) (EB 35 PARA. 15)
10	GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES (EB 54 ANNEX 13)
11	IMPLEMENTATION PLAN FOR STANDARDS FOR PROGRAMME OF ACTIVITIES (VERSION 01.0, EB 64 ANNEX 2)
12	STANDARD FOR SAMPLING AND SURVEYS FOR CDM PROJECT ACTIVITIES AND PROGRAMME OF ACTIVITIES (VERSION 03.0, EB 69 ANNEX 4)
13	GUIDELINES FOR SAMPLING AND SURVEYS FOR CDM PROJECT ACTIVITIES AND PROGRAMME OF ACTIVITIES (VERSION 02.0, EB 69 ANNEX 5)
14	GENERAL GUIDELINES FOR SAMPLING AND SURVEYS FOR SMALL-SCALE CDM PROJECT ACTIVITY (EB 50 ANNEX 30)

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable
CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

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15 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)
16 NON-BINDING BEST-PRACTICE EXAMPLES TO DEMONSTRATE ADDITIONALITY FOR SSC PROJECT ACTIVITIES (EB 35 ANNEX 34)
17 GUIDELINES FOR OBJECTIVE DEMONSTRATION AND ASSESSMENT OF BARRIERS (EB 50 ANNEX 13)
18 TOOL TO CALCULATE THE EMISSION FACTOR FOR AN ELECTRICITY SYSTEM (VERSION 02.2.1)
19 TOOL FOR THE DEMONSTRATION AND ASSESSMENT OF ADDITIONALITY" (VERSION 6.0)
20 GUIDELINES ON ADDITIONALITY ON FIRST OF ITS KIND PROJECT ACTIVITIES (EB 63 ANNEX 11)
21 SSC WG CLARIFICATION (SSC_630)
22 EB DECISIONS PUBLISHED ON UNFCCC.INT

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Protocol 1A: General CDM Requirements

	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.		DR	~~CAR 9~~	OK
	Comment: CAR 9: 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 9 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.			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.			OK	OK
	Comment: The LoAs are unconditional. SQS validated that these additional conditions introduced by the DNA of India do not compromise VVM Article 45-46 requirements. Therefore, the LoA of India 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.			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.			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.			~~CAR 10~~	OK
	Comment: CAR 10: There is no full consistency in names in the draft MoC and signed versions are missing. Documentation, including the MoC form, is consistent. The PPs' participation was approved by parties to the Kyoto Protocol. CAR closed.				
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 project participant has been approved by at least one party involved, either in a Letter of Approval 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.		DR	~~CL 17~~	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

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	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	Comment: CL 17: Table A.3 of the PoA DD (page 5) does not contain any indication of the CME. The PPs are listed appropriately in the PoA documentation and they are the only entities that were approved by the respective DNAs. CL closed				
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.			OK	OK
	Comment: The authenticity of the LoAs is unambiguous..				
1.3	**PROJECT DESIGN DOCUMENTS**				
[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.		DR	OK	OK
	Comment: The PoA documentation has used the latest template				
1.3.1 [1] 56	The DOE shall determine whether the PDD are in accordance with the applicable CDM requirements.		DR	~~CAR 6~~ ~~CAR 20~~	OK
	Comment: CAR 6: Several equations have no sources and/or cannot be read due to low quality in presentation (PoA-DD, p.30ff.). Some pages contain typos (PoA-DD, p. 34f./40; CPA-DD, p.7f.). Table 9 in CPA-DD is double. Links to webpages have been removed or are missing. Exact scientific approach to references is not consistently applied. CAR 20: clear statement about the scope is missing The PoA documentation has been revised and is in full compliance with relevant forms and guidance CAR closed.				
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.		DR, I	~~CL 9~~	OK
	Comment: CL 9: Please elaborate on and provide a line diagram of the number of lamps to be replaced in the first specific CPA. Line diagrams have been submitted. CL closed. Project description is transparent and clear				
1.4.1 [1] 59	The DOE shall confirm that the description of the proposed CDM project activity as contained in the PDD 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.		DR, I	~~CAR 14~~	OK
	Comment: CAR 14: Verifiable justification why the small-scale specific CPA is eligible to be included in the PoA is missing (please refer also to CAR 3). The text of the specific CPA-DD (CPA-001) has been revised to make it more specific to include only sites which are owned, managed, operated or built by IOT. CAR closed. Project activities both for the PoA level and the 1st and the generic CPAs are clearly described.				
1.4.2 [1] 60	For proposed CDM project activities in existing facilities or utilizing existing equipment, 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: (a) Large scale projects; (b) Non-bundled small-scale projects with emission reductions exceeding 15,000 tons per year; (c) Bundled small-scale projects, each with emission reductions not exceeding 15,000 tons per year; in such cases the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical analysis.		I	OK	OK

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	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.				
1.4.3 [1] 61	For other individual proposed small-scale CDM project activities with emission reductions not exceeding 15,000 tons per year, the DOE may conduct a physical site visit as appropriate.				NA
	Comment:				
1.4.4 [1] 62	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.				NA
	Comment:				
1.4.5 [1] 63	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.				NA
	Comment:				
1.5	**BASELINE AND MONITORING METHODOLOGY**				
1.5.1	**General requirement**				
1.5.1.1 [1] 65	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.		DR	OK	OK
	Comment: AMS.II.C version 13 is approved by EB and is valid. The baseline and monitoring methodology used in the project fully complies with CDM EB requirements.				
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.		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.		DR, I	~~CL 1~~ ~~CL 3~~ ~~CL 5~~ ~~CL 14~~	OK
	Comment: CL 1: The "outage factor" of the old lamps is likely higher than the one monitored for the LEDs (longer lifetime, higher reliability, better warranty due to higher investment costs). How do you ensure that the baseline is conservative (and emission reductions are not overestimated for conventional lamps which would not have been replaced in the baseline scenario)? CL 3: The site visit revealed that more than 10% of lamps were broken. How do you ensure that the option to choose between sample and fixed value is conservative enough and which procedure covers the appropriate rule? CL 5: There is an inconsistency in the number of end-users in CPA-001 CL 14: "*Anywhere in the document where it is stated "India" as a reference to the geographic boundary of the PoA it could also mean "other countries added post registration*" The statement is				

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	unclear, since the PoA DD submitted for validation cannot meet EB60 Annex 26/ II. 6 a, b, c in advance. For further details on resolution of these CLs please refer to the sections below and the detailed summary of requests.				
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.		DR	OK	OK
	Comment: version 13 of AMS.II.C is still valid				
[1] 69	The DOE shall apply specific guidance provided by the CDM Executive Board in respect to any approved methodology.		DR	OK	OK
	Comment: All EB clarifications with potential relevance to the project activity have been considered. To validate the sampling plan EB 69 Annex 5 has been used by the DOE.				
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.		DR	~~CAR 6~~	OK
	Comment: The methodology is correctly quoted. CAR 6: Several equations have no sources and/or can not be read due to low quality in presentation. DDs have been revised CAR closed				
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 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.		DR, I	~~CAR 18~~ ~~CAR 2~~	OK
	Comment: CAR 2: There is no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,v13, §17 to allow for neglectance of leakage. The project participants have included the procedure for collecting and/or storing including scrapping, as per AMS-II.C version 13 para. 17, CAR closed. CAR 18: Applicability of the selected methodology to the proposed programme activity is not OK. Following the CAR the sampling procedure of "number" and "power" acc. para. 12 AMS.II-C has been added to the monitoring plan. CAR closed. All applicability criteria of of the selected methodology are discussed in the Validation Report.				
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.		DR, I	OK	OK
	Comment: The methodology is deemed applicable.				
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.		DR, I	NA	OK

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	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.		DR	NA	OK
	Comment: Clarification of revision to or deviation is not required.				
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.		DR	NA	OK
	Comment:				
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.		DR, I	~~CL 4~~ ~~CL 14~~	OK
	Comment: CL 4: The operational manual does not specify the process clear enough how the appropriate grid (NEWNE or South) is determined and how it is ensured that only facilities in the same grid are gathered within a specific CPA. The prosedure on how to delinate the appropriate grid has been added to the operational manuel. CL closed CL 14: "Anywhere in the document where it is stated "India" as a reference to the geographic boundary of the PoA it could also mean "other countries added post registration" The statement is unclear, since the PoA DD submitted for validation cannot meet EB60 Annex 26/ II. 6 a, b, c in advance. Project boundary has been revised to India for PoA and all CPA. CL closed				
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.		DR	~~CL 15~~	OK
	Comment: CL 15: It is unclear why the CPA-DD_001 does not provide information on the unique identification of the first project site. CL has been closed due to resolution of CAR 3 and CAR 14. Project boundary is appropriately described				
1.5.4	**Baseline identification**				
[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.		DR, I	~~CAR 1~~	OK
	Comment: CAR 1: Greenfield activities: The operationalisation to determine the "most conservative common practice" (see CME OM, p.12 etc.) is not adequately provided. There is no adequate clear procedure for the establishment of the baseline for all potential or targeted greenfield activities (incl. targeted lightning areas, criteria, database with least electricity consuming available non–LED lightning equipment (lecaNotLEDle) that determines how the light output service level in Lux as recommended for the application in question by national standard and/or code [CFL xWatt for xLux @targeted lighting area z listed in national lighting code page xx], template form etc.) would be provided. The proposed unclear procedure is even not applied at site 1 of CPA 1. Furthermore, it is not clear how it would be ensured that the recommended standard would have been applied (to				

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	avoid overestimation of baseline emissions) and how do you account for general and or specific market segment increases of LED penetration rate over time that are not induced by the PoA ? Lastly, when referring to greenfield activities "at locations where LED equipment is not the common practice" (PoA-DD, v02, p.7; but also p.15) the latest guidance on common practice (EB63, Annex 12) has not been referenced. PPs revised the procedure. CAR closed				
[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.		DR	OK	OK
	Comment: Additionality of the PoA is demonstrated using the criteria outlined inEB 68 Annex 27 To ensure a well-developed discussion of additionality, the 'Tool for the demonstration and assessment of additionality' (version 6.1) is used as guideance, comprising the following steps: Step 1. Identification of alternative scenarios; Step 3. Barrier analysis; and Step 4. Common practice analysis.				
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.		DR, I	OK	OK
	Comment: All the assumptions and data used by the project participants are listed in the PDD, including their references and sources. All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD.				
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.		DR, I	~~CAR1~~ ~~CAR 7~~ ~~CL 1~~ ~~CL 3~~ ~~CL 6~~ ~~CL 7~~ ~~CL 19~~	OK
	Comment: CAR 1: Greenfield activities: The operationalisation to determine the "most conservative common practice" (see CME OM, p.12 etc.) is not adequately provided. There is no adequate clear procedure for the establishment of the baseline for all potential or targeted greenfield activities (incl. targeted lighting areas, criteria, database with least electricity consuming available non–LED lighting equipment (lecaNotLEDle) that determines how the light output service level in Lux as recommended for the application in question by national standard and/or code [CFL xWatt for xLux @targeted lighting area z listed in national lighting code page xx], template form etc.) would be provided. The proposed unclear procedure is even not applied at site 1 of CPA1. Furthermore, it is not clear how it would be ensured that the recommended standard would have been applied (to avoid overestimation of baseline emissions) and how do you account for general and or specific market segment increases of LED penetration rate over time that are not induced by the PoA ? Lastly, when referring to greenfield activities "at locations where LED equipment is not the common practice" (PoA-DD, v02, p.7; but also p.15) the latest guidance on common practice (EB63, Annex 12) has not been referenced. CAR 7: It is unclear how comparability of service level is ensured for greenfield activities (which current lamps (with what lumen and watt) would be replaced with what LED lamps (lumen and watt)				

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	to ensure compliance with the National Lightning Code 2010 (lux/m^2). CL 1: The "outage factor" of the old lamps is likely higher than the one monitored for the LEDs (longer lifetime, higher reliability, better warranty due to higher investment costs). How do you ensure that the baseline is conservative (and emission reductions are not overestimated for conventional lamps which would not have been replaced in the baseline scenario)? CL 3: The site visit revealed that more than 10% of lamps were broken. How do you ensure that the option to choose between sample and fixed value is conservative enough and which procedure covers the appropriate rule? CL 6: Please submit evidence of BEE regarding the relative high value of 30% for average annual technical grid losses used. Furthermore the operational manual does not adequately address the technical loss issue at the CPA level. CL 7: How do you ensure comparable service levels (lux/m2) for each individual stratum of a CPA given that ID 5/pi and ID 6/pk only refers to each CPA? See also CAR 1, CAR 5, CL1, CAR 7 and CAR 8. CL 19: The Project Participants revised in PoA-DD version 5.1 Section A.4.3. The identified alternatives to the programme of activity are: 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. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity. Scenario 3 Programme achieving the same results 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. 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: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; - Other Barriers (institutional, managerial resources and capacity to absorb new technologies) It is unclear why baseline scenarios and the barrier analysis have been revised. Further, there is an inconsistency between Greenfield baseline scenarios E.4 and scenarios discussed in the identification of baseline alternatives A.4.3 All assumptions and data used by the project participants are listed in the PDD, including their references and sources. All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. 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.		DR	~~CL 11~~	OK
	Comment: CL 11: Relevant national and/or sectoral policies and circumstances are considered but not listed in the PoA DD (sub-step 1b, p. 11):				
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.		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.				

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1.5.5	**Algorithms and/or formulae used to determine emission reductions**				
[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.		DR	OK	OK
	Comment: equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring methodology				
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.		DR	~~CAR 7~~ ~~CAR 15~~ ~~CL 5~~	OK
	Comment: CL 5: There is an inconsistency in the number of end-users in CPA-001. CAR 7: It is unclear how comparability of service level is ensured for greenfield activities (which current lamps (with what lumen and watt) would be replaced with what LED lamps (lumen and watt) to ensure compliance with the National Lightning Code 2010 (lux/m^2). CAR 15: Estimated emission reduction in 2012 (B.5.3) is not correctly calculated. Table 1 is not consistent to Table 6.				
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.		DR,I	~~CL 1~~ ~~CL 6~~ ~~CAR 7~~	OK
	Comment: CL 6: Please submitt evidence of BEE regarding the relative high value of 30% for average annual technical grid losses used. Furthermore the operational manual does not adequately address the technical loss issue at the CPA level. CAR 7: How do you ensure comparable service levels (lux/m^2) for each individual stratum of a CPA given that ID 5/pi and ID 6/pk only refers to each CPA ? CL 1: The "outage factor" of the old lamps is likely higher than the one monitored for the LEDs (longer lifetime, higher reliability, better warranty due to higher investment costs). How do you ensure that the baseline is conservative (and emission reductions are not overestimated for conventional lamps which would not have been replaced in the baseline scenario). 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 PDD.				
1.6	**ADDITIONALITY OF A PROJECT ACTIVITY**				
[1] 94	The PDD shall describe how a proposed CDM project activity is additional.		DR, I	OK	OK
	Comment: Barrier analysis done				
1.6.1 [1] 95	The DOE shall assess and verify the reliability and credibility of all data, rationales, assumptions, justifications and documentation provided by project participants to support the demonstration of additionality. This requires the DOE		DR	OK	OK

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	to critically assess the presented evidence, using local knowledge and sectoral and financial expertise.				
	Comment: Please refer to Annex C documents reviewed				
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.		DR, I	OK	OK
	Comment: Barriers have been assessed according: 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 EB 69 Annex 27 Clarifications to the SSC Working group AT version 6.0 as a guidance (not mandatory for SSC)				
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.		DR, I	~~CL 19~~	OK
	Comment: CL 19: The Project Participants revised in PoA-DD version 5.1 Section A.4.3. The identified alternatives to the programme of activity are: 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. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity. Scenario 3 Programme achieving the same results 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. 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: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; - Other Barriers (institutional, managerial resources and capacity to absorb new technologies) It is unclear why baseline scenarios and the barrier analysis have been revised. Further, there is an inconsistency between Greenfield baseline scenarios E.4 and scenarios discussed in the identification of baseline alternatives A.4.3				
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.		DR, I	OK	OK
	Comment: See CL 19, the DOE considers the list of alternatives to be complete.				
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		DR		**NA**

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	(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).				
	Comment: Acc. EB 69, Annex 27 Investment Analysis is not mandatory for SSC PoA				
[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; (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.				**NA**
	Comment:				
[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".				**NA**
	Comment:				
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.				**NA**
	Comment:				
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.				**NA**
	Comment:				

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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; (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.				**NA**
	Comment:				
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.		DR	~~CAR 19~~ ~~CL 12~~	OK
	Comment: CAR 19: Within SSC projects the barrier analysis approach can be carried out by different ways including the techniques that resemble the elements of the Additionality 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 Additionality 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 Additionality Tool the PoA DD wording is misleading in its references to the Additionality Tool. CL 12: The technological barrier is not sufficiently supported by evidence.				
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.		DR	OK	OK
	Comment: There are no Issues that have a clear direct impact on the financial returns of the PoA				
1.6.4.2 [1] 117	The DOE shall apply a two-step process to assessing the barrier analysis performed as follows: (a) *Determine whether the barriers are real.* 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		DR	OK	OK

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	evidence, it shall raise a CAR to have reference to this barrier removed from the project documentation; (b) *Determine whether the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives.* 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 *at least one of* the possible alternatives, in particular the identified baseline scenario.				
	Comment: the barrier analysis is performed in credible manner using reputable sources.				
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 additionality tool) to confirm that the project activity is not widely observed and commonly carried out in the region.		DR	OK	OK
	Comment: As per the General Guidelines to SSC CDM methodologies (version17) 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 save Energy 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"				
1.6.5.1 [1] 120	The DOE shall use its local and sectoral expertise to: (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; (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; (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.		DR, I	OK	OK
	Comment: SQS performed a research on similar project activities in India. The following implemented programme has been identified: LED street-lighting pilot program Kolkata, which is part of The Climate Group's international LightSavers programme, supported by HSBC, and joins 10 other pilots in world cities including Hong Kong, New York, London, Sydney, Tianjin (China), and Toronto [70]. The Kolkata pilot programme targets only street lighting in the area of Kolkata while the proposed CDM PoA involves installation of indoor and outdoor LED lighting equipment in publicly, commercially, industrially or otherwise employed locations. The PoAs geographic scope and the scope of application are not comparable to the LED street-lighting pilot program Kolkata.				

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	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, other than CDM project activities, are not already widely observed and commonly carried out in the defined geographic scope. Further, 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.				
1.7	**MONITORING PLAN**				
[1] 122	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.		DR	OK	OK
	Comment: PoA DD includes a monitoring plan, OM manual further elaborates the monitoring procedures				
1.7.1 [1] 123	The DOE shall apply a two-step process to assessing compliance with this requirement as follows: (a) *Compliance of the monitoring plan with the approved methodology.* The DOE shall: (i) By means of document review, identify the list of parameters required by the selected approved methodology; (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; (b) *Implementation of the plan.* 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: (i) The monitoring arrangements described in the monitoring plan are feasible within the project design; (ii) The means of implementation of the monitoring plan, including the data 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.		DR, I	~~CL 3~~ ~~CL 4~~ ~~CL 8~~ ~~CL 18~~ ~~CAR 2~~ ~~CAR 4~~ ~~CAR 5~~ ~~CAR 8~~	OK
	Comment: CL 3: The site visit revealed that more than 10% of lamps were broken. How do you ensure that the option to choose between sample or fixed value is conservative enough and which procedure covers the appropriate rule? CL 4: The operational manual does not specify the process clear enough how the appropriate grid (NEWNE or South) is determined and how it is ensured that only facilities in the same grid are gathered within a specific CPA. CL 8: There is insufficient detail in the CME monitoring procedures. Furthermore, a graphical chart with details has been requested (see CAR4) CL 18: It is unclear how the CME shall have control over each CPA. The Monitoring/ Scrapping/ Financing role in this regard is not clear. Especially as this entity is "not to disclose". What happens if this entity will claim that the monitoring is OK? Who has control? Please describe the situation clearly. CAR 2: There is no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,V13, §17 to allow for neglectance of leakage. Please ensure that this procedure determines in detail the roles and responsibilities, incl. CME and provides assurance that future legislation on electronic waste of replaced lamps is respected in line with PoA-DD, p. 4 and that legal compliance can be regularly verified by a DOE. CAR 4: Graphical process chart specifying all monitored parameters for all strata for a specific CPA with different locations is not provided yet. Is is unclear what national standards and norms will be applied. Not all procedures provide specific measures that ensure proper QA/QC.				

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	CAR 5: There is insufficient detail on the proposed stratification as the four clusters are not properly reflected in the setup of specific CPA, incl. monitoring, operational manual and forms. Furthermore, the specifications of the technologies including the level and typ of services and the performance specifications including compliance with testing/certification are not clear (EB63, A3: standard for eligibility criteria, §13c). It remains unclear which type of LED lamp (Watt) may/will replace which type of non-LED lamp (Watt) and how the same service level (lux/m2) is ensured and verified. A simple comparising of watt is not traceable and makes the assessment of greenfield activities impossible. Finally, the latest upcoming guidance on sampling (currently under finalisation) has not been referenced. CAR 8: With regard the operational and management plan: The set of forms are incomplete and do not contain all relevant details that allow for direct application and electronic search (e.g. all stratification groups, exact full wording etc.).				
1.8	**SUSTAINABLE DEVELOPMENT**				
[1] 125	CDM project activities shall assist parties not included in Annex I to the Convention in achieving sustainable development.		DR	~~CAR 9~~	OK
	Comment: Letter of Approval of the DNA of India, acting as host, is was requested by CAR 9. The PoA contribution to sustainable development in India is confirmed by LoA.				
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.		DR	~~CAR 9~~	OK
	Comment: The PoA contribution to sustainable development in India is confirmed by LoA of India.				
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.		DR	OK	OK
	Comment: Local stakeholder consultation is done at PoA level; this is according to EB 55, Annex 38. A local stakeholder consultation was organised on 22 July, 2011 at the hotel Meluha The Fern in Mumbai, India.				
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.		DR	OK	OK
	Comment: The choice for PoA level is informed by the fact that all potential installations of LEDs have similar features at national and subnational level. As the distribution of the programme is throughout India, so the stakeholders are also based across India. Therefore the Local Stakeholder Consultation organised at PoA level has captured all relevant stakeholders				
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.		DR, I	OK	OK
	Comment: The proposed programme of activity involves the distribution and installation of LED lighting equipment. The host party India does not require an environmental impact assessment for this programme of activity. With regard to the CPAs the Indian Government does not require an environmental impact assessment.				
1.10.1 [1]	The DOE shall confirm, by means of a document review and/or using local official sources and expertise, whether the project participants have undertaken		DR	OK	OK

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132	an analysis of environmental impacts and, if required by the host party, an environmental impact assessment.				
	Comment: SQS' 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				
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.				
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.		DR	OK	OK
	Comment: PoA CPA eligibility criteria N°14 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.				
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.		DR	OK	OK
	Comment: 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.				
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.				OK

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	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
	Comment: Please refer to Protocol 1B (below)				
2.5.1	**Operational and management arrangements for the PoA**				
[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.				OK
	Comment: Please refer to Protocol 1B (below)				
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.				OK
	Comment: Please refer to Protocol 1B (below)				
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.				OK
	Comment: Please refer to Protocol 1B (below)				
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.				OK
	Comment: Please refer to Protocol 1B (below)				
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				**NA**

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	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 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: The validation report shall contain a description of the progress made in project implementation. Further, the DOE shall validate that the project participants have obtained written confirmation from the host party that the delay will not alter the project's contribution to sustainable development.				

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Protocol 1B: Specific Requirements for Programme of Activities

	Requirement	Ref.	MoV	Draft Concl.	Final Concl.
3	**Programme of Activities**				
3.1	**Requirements for Validation of a PoA**				
3.4.1 [15] 13	The coordinating/managing entity shall submit to a DOE the following documentation: a) A completed CDM-POA-DD; b) A PoA generic CDM-CPA-DD, which specifies the generic information relevant to all CPAs that may be included in the PoA; c) A completed CDM-CPA-DD which is to be based on the application of the PoA to one real case.	[15]	DR	OK	OK
	Comment: The three required documents were submitted to the DOE at the start of the validation.				
3.4.1 [15] 15	In addition to the validation requirements arising out of the modalities and procedures for a clean development mechanism, the validation by the DOE shall address the following issues: a) Additionality of the PoA (see 4 e above); b) Eligibility criteria for inclusion of a proposed CPA in the registered PoA, including criteria to be used for demonstration of additionality of a CPA; c) Operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA inter alia the issues identified in paragraph 6 (i) above; d) Consistency between CDM-POA-DD and the PoA generic CDM-CPA-DD to be used for inclusion of a CPA in the registered PoA; e) In cases where more than one approved methodology will be applied to each CPA, confirmation that the application of multiple methodologies has been approved in accordance with "Procedures for approval of the application of multiple methodologies to a programme of activities"	[1-3]	DR	OK	OK
	Comment: (a)-(d) have been assessed during validation (details below), e is not applicable				
3.2	**Requirements for the CDM-POA-DD**				
[10] 6	The coordinating/managing entity shall develop a PoA Design Document (CDM-POA-DD) setting a framework for the implementation of the PoA and unambiguously defining a CPA under the PoA. The CDM-POA-DD shall include the following information:				
3.2.1 [15] 6a	The coordinating/managing entity, host party(ies) and PoA participants shall be identified in the CDM-POA-DD	[1-3]	DR	~~CL 17~~	OK

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	Comment:	CL17: Table A.3 of the PoA DD (page 5) does not contain any indication of the CME. Mabanaft Carbon India Pvt. Ltd. is the programme's Coordinating or Managing Entity (CME)				
3.2.2 [15] 6b	The boundary for the PoA shall be defined CDM-POA-DD in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all CPAs included in the PoA will be implemented, taking into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary are reflected in the determination of the baseline		[1-3]	DR	~~CL 14~~	OK
	Comment:	CL 14: "Anywhere in the document where it is stated "India" as a reference to the geographic boundary of the PoA it could also mean "other countries added post registration" The statement is unclear, since the PoA DD submitted for validation cannot meet EB60 Annex 26/ II. 6 a, b, c in advance.				
3.2.3 [15] 6c	The policy/measure or stated goal that the PoA seeks to promote shall be described in the CDM-POA-DD		[1-3] A.2	DR	OK	OK
	Comment:	The stated goal of greenhouse gas emission reduction through the replacement of baseline lighning system by more energy efficient LEDs is described sufficiently in the PoA documentation.				
3.2.4 [15] 6d	The CDM-POA-DD shall provide information that the proposed PoA is a voluntary action by the coordinating/managing entity		[1-3] A.2	DR	OK	OK
	Comment:	The voluntary nature of the PoA is provided in the documentation.				
3.2.5 [15] 6e	It shall be demonstrated that in the absence of the CDM either: (i) the proposed voluntary measure would not be implemented, or (ii) the mandatory policy/regulation would be systematically not enforced and that non-compliance with those requirements is widespread in the country/region, or (iii) that the PoA will lead to a greater level of enforcement of the existing mandatory policy /regulation. This shall constitute the demonstration of additionality of the PoA as a whole;		[1-3] E.5. 1	DR	~~CAR 12~~ ~~CAR 16~~	OK
	Comment:	CAR 12: Eligibility criteria 7 "*Shall the CPA meet the requirements pertaining to the demonstration of additionality laid forth in additionality-related guidelines, tools or any requirements embedded in the methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" version 13?*" is not appropriately formulated to justify the demonstration of additionality of each CPA to be included. CAR 16: Additionality is provided at PoA level. Individual CPA additionality is addressed by eligibility criteria 7 and 8. It is unclear how compliance to criteria 7 will be proven and in particular how you justify criteria 8 regarding CPA 001. Particularly with regard to the fact that only one project site is known yet. In the absence of the CDM the proposed voluntary measure would not be implemented. The LED's Save Energy programme is a commercial initiative solely based on expected CER revenues.				
3.2.6 [15] 6f	The CDM-POA-DD shall describe a typical CPA that will be included in the PoA covering the technology or measures to be used, justification of the choice of an approved baseline and monitoring methodology (or combination of approved Methodologies), application of an approved baseline and monitoring methodology. The combination of methodologies will only be allowed once approved in accordance with "Procedures for approval of the application of multiple methodologies to a programme of activities". If a combination of approved methodologies is being applied this combination must be applied to all CPAs and must be applied in a consistent manner.		[1-3]	DR	~~CAR 16~~ ~~CAR 17~~	OK

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	Comment:	CAR 16: Additionality is provided at PoA level. Individual CPA additionality is addressed by eligibility criteria 7 and 8. It is unclear how compliance to criteria 7 will be proven and in particular how you justify criteria 8 regarding CPA 001. Particularly with regard to the fact that only one project site is known yet. CAR17: Compliance with the PoA eligibility criteria has not been documented in the specific CPA-DD, Further; please provide the results of the assessments or other verifiable documents.				
3.2.7 [15] 6g	The PDD-POA-DD shall define the eligibility criteria for inclusion of a project activity as a CPA under the PoA, which shall include, as appropriate, criteria for demonstration of additionality of the CPA, and the type and/or extent of information (e.g. criteria, indicators, variables, parameters or measurements) that shall be provided by each CPA in order to ensure its eligibility		[1-3]	DR	~~CAR 16~~ ~~CAR 17~~ ~~CL 13~~ ~~CL 16~~	OK
	Comment:	CAR 16 and 17 see above CL 13: It shall be further detailed how various CPAs can be distinguished from each other. CL 16: It is unclear how the CPA-001 owner can confirm that the proposed CPA is not part of another registered PoA. Please submit the assessment results.				
3.2.8 [15] 6h	Starting date and length of the PoA shall not exceed 28 years (60 years for A/R);		[1-3]	DR	~~CAR 21~~	OK
	Comment:	Length of the programme of activities (PoA) is 28 years CAR 21: the 1st CPA crediting period is missing in the CPA DD and it must not be earlier than date of inclusion in the registered PoA (or any date later).The duration of the crediting period shall not exceed the end date of the PoA.				
3.2.9 [15] 6i	The PDD-POA-DD shall describe the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including a record keeping system for each CPA under the PoA, a system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA, the provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA.		[1-3]	DR, I	~~CAR 1~~ ~~CAR 3~~ ~~CAR 4~~ ~~CAR 8~~ ~~CL 10~~ ~~CL 4~~	OK
	Comment:	CAR 1: operationalisation to determine the most conservative common practice is not adequately provided. CAR 3: The proposed CME operational procedures does not sufficiently 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 (EB63, A3)., in particular when considering §9 and §13. Furthermore, not all forms and fully detailed templates, incl. contractual agreements to be applied in line with the operational procedures to enable DOE's assessment of the management system have been provided. CAR 4 There is insufficient detail in the CME monitoring procedures. Furthermore, a graphical chart with details has been requested CAR 8: With regard the operational and management plan: The set of forms are incomplete and do not contain all relevant details that allow for direct application and electronic search (e.g. all stratification groups, exact full wording etc.). CL 10: The CME operational procedures include a template for the waiver of CERs (CME/01/18). The reference number is wrong. Evidence for the waiver of CERs for CPA-001 can not be found. CL 4: The operational manual does not specify the process clear enough how the appropriate grid (NEWNE or South) is determined and how it is ensured that only facilities in the same grid are gathered within a specific CPA.				
3.2.10 [15] 6j	The PDD-POA-DD shall describe a monitoring plan for a CPA, developed in accordance with the approved monitoring methodology, and identify the monitoring provisions and data parameters a CPA has to apply/monitor		[1-3]	DR, I	~~CAR 2~~ ~~CAR 4~~ ~~CAR 5~~ ~~CAR 7~~ ~~CAR 8~~	OK

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	Comment:	CAR 2: There is no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,v13, §17 to allow for neglectance of leakage. Please ensure that this procedure determines in detail the roles and responsibilities, incl. CME and provides assurance that future legislation on electronic waste of replaced lamps is respected in line with PoA-DD, p. 4 and that legal compliance can be regularly verified by a DOE. CAR 4: Graphical process chart specifying all monitored parameters for all strata for a specific CPA with different locations is not provided yet. Is is unclear what national standards and norms will be applied. Not all procedures provide specific measures that ensure proper QA/QC. CAR 5: There is insufficient detail on the proposed stratification as the four clusters are not properly reflected in the setup of specific CPA, incl. monitoring, operational manual and forms. CAR 7: It is unclear how comparability of service level is ensured for greenfield activities (which current lamps (with what lumen and watt) would be replaced with what LED lamps (lumen and watt) to ensure compliance with the National Lightning Code 2010 (lux/m2). CAR 8: Please submitt evidence of BEE regarding the relative high value of 30% for average annual technical grid losses used. Furthermore the operational manual does not adequately address the technical loss issue at the CPA level.				
3.2.11 [15] 6k	If the coordinating /managing entity does not wish to have all CPAs verified, the CDM-POA-DD shall describe the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA[1]. [1]Note, that the Board will develop a guideline containing criteria for determining statistically sound verification techniques and methods. Project developers are requested to take note that programmes which may be registered as a single CDM project activity prior to the adoption of this guideline will be required to comply with such criteria at the point of verification.	[1-3]	DR	NA	**NA**
	Comment:	Each CPA will be monitored separately			
3.2.12 [15] 6l	Environmental analysis of the PoA as per requirements of the CDM modalities and procedures (See Protocol 1a above). If this analysis is not undertaken for the PoA but is to be done at the CPA level this shall be described and reflected in the CDM-POA-DD and the CDM-CPA-DD.	[1-3]	DR	OK	OK
	Comment:	Environmental analysis is done on PoA level			
3.2.13 [15] 6m	If comments by local stakeholders were invited with regard to the total PoA, the CDM-POA-DD shall contain information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable. If such comments are to be sought at the CPA level this shall be described and reflected in the CDM-POA-DD and the CDM-CPA-DD.	[1-3]	DR	OK	OK
	Comment:	CDM-POA-DD contains information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received. The choice for PoA level is informed by the fact that all potential installations of LEDs have similar features at national and subnational level. As the distribution of the programme is throughout India, so the stakeholders are also based across India. Therefore the Local Stakeholder Consultation organised at PoA level has captured all relevant stakeholders.			
3.2.14 [15] 6n	In case public funding is used the CDM-POA-DD shall contain a confirmation that official development assistance is not being diverted to the implementation of the PoA.	[1-3]	DR	NA	
	Comment:	No public funding			

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3.3 [15] 7	**Requirements for the CDM-CPA-DD**				
	The coordinating/managing entity shall prepare the PoA specific CDM Programme Activity Design Document (CDM-CPA-DD) using the provisions of the proposed PoA. The CDM- CPA-DD shall contain the following information:				
3.3.1 [15] 7a	The CDM- CPA-DD shall contain the geographic reference or other means of identification (For example, in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices), Name/contact details of the entity/individual responsible for the operation of the CPA.	[3]	DR	~~CL 13~~ ~~CL 15~~ ~~CL 16~~	OK
	Comment:	Entity responsible for the operation of the CPA-001 is Mabanaft Carbon India Pvt. Ltd. Means of identification: Exact installation location will be described by a: • Unique address or description of location (room number, name of terminal, industrial facility etc. • If necessary, position of equipment in the operator's own record keeping system (based on constructional drawing, building or site design, road kilometre marks etc.) CL 13: It shall be further detailed how various CPAs can be distinguished from each other. CL 15: It is unclear why the CPA-DD_001 does not provide information on the unique identification of the first project site. CL 16: It is unclear how the CPA-001 owner can confirm that the proposed CPA is not part of another registered PoA. Please submit the assessment results.			
3.3.2 [15] 7b	The CDM- CPA-DD shall contain the host party.	[3]	DR	OK	OK
	Comment:	host party is India			
3.3.3 [15] 7c	The CDM- CPA-DD shall contain starting date, type (fixed or renewable) and duration of the crediting period of the CPA taking into account that the starting date of a crediting period of the CPA shall be the date of its inclusion in the registered PoA or any date thereafter and that the duration of the crediting period shall not exceed the end date of the PoA.	[3]	DR	~~CL 2~~	OK
	Comment:	CL 2: There is an inconsistency in the date of the first LED lighting equipment installed. Please clarify and unambiguously specify all starting dates.			
3.3.4 [15] 7d	The CDM- CPA-DD shall contain confirmation 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 is first published for global stakeholder consultation.	[3]	DR	~~CAR 13~~ ~~CAR 21~~	OK
	Comment:	CAR 13: The CPA-DD does not contain confirmation 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 is first published for global stakeholder consultation. CAR 21: the 1st CPA crediting period shall be indicated in the CPA DD and it must not be earlier than date of inclusion in the registered PoA (or any date later).The duration of the crediting period shall not exceed the end date of the PoA.			
3.3.5 [15] 7e	The CDM- CPA-DD shall contain information stipulated in the PoA for use by each CPA to demonstrate how it meets requirements with respect to: (i) Fulfilling the eligibility criteria specified in the CDM-POA-DD, including, as appropriate, the demonstration of the additionality of the CPA; (ii) Calculations of baseline emissions and estimated emission reductions sources or removal by sinks of greenhouse gases.	[3]	DR	~~CAR 11~~ ~~CAR 14~~ ~~CAR 16~~ ~~CAR 17~~	OK

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	Comment:	CAR 11: An applicability criterion (c) has not been addressed as an eligibility criterion to include a CPA to the PoA framework CAR 14: Justification of why the small-scale specific CPA is eligible to be included in the PoA is missing CAR 16: Additionality is provided at PoA level. Individual CPA additionality is addressed by eligibility criteria 7 and 8. It is unclear how compliance to criteria 7 will be proven and in particular how you justify criteria 8 regarding CPA 001. Particularly with regard to the fact that only one project site is known yet. CAR 17: Compliance with the PoA eligibility criteria has not been documented in the specific CPA-DD, Further; please provide the results of the assessments or other verifiable documents.				
3.3.6 [15] 7f	The CDM- CPA-DD shall contain an environmental analysis as per requirements of the CDM modalities and procedures, unless the analysis may be undertaken for the whole PoA as reflected in the CDM-POA-DD.	[3]	DR	OK	OK
	Comment:	Information is provided at the PoA level			
3.3.7 [15] 7g	The CDM- CPA-DD shall contain Iinformation on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable unless the comments may be sought for the whole PoA as reflected in the CDM-POA-DD.	[3]	DR	OK	OK
	Comment:	Local stakeholders consultation is provided at the PoA level			
3.3.8 [15] 6h	The CDM- CPA-DD shall contain cconfirmation that the CPA is neither registered as a CDM project activity nor included in another registered PoA.	[3]	DR	~~CL 16~~	OK
	Comment:	CL 16: It is unclear how the CPA-001 owner can confirm that the proposed CPA is not part of another registered PoA. Please submit the assessment results.			
3.4	**Requirements for Participation in the PoA**				
[10] 8	The operators of individual CPAs are not required to be project participants. CDM programme participation is only recorded at the PoA level.				
3.4.1 [15] 9	The coordinating/managing entity shall obtain letters of approval from each host party and Annex I party which wishes to be involved in the PoA. Letters of approval shall be issued in accordance with the guidance provided by the Board (EB 16 Report, Annex 6).	[1]	DR	~~CAR 9~~	OK
	Comment:	CAR 9: LoAs missing			
3.4.2 [15] 10	The coordinating/managing entity shall obtain letters of authorization of its coordination of the PoA from each host party.	[1]	DR	~~CAR 9~~	OK
	Comment:	Indian LoA refers to Mabanaft Carbon India as CME			
3.4.3 [15] 11	The latest version of the Procedures for modalities of communication between project participants and the Executive Board" shall apply, with the exception that the coordinating/managing entity shall be either sole or joint focal point for each area of communication. The limit of joint focal points for the programme shall be 5, or equal to the number of host Parties if greater than 5.	[1]	DR	~~CAR 10~~	OK
	Comment:	CAR 10: There is no full consistency in names in the draft MoC and signed versions are missing.			

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3.4.4 [15] 12	If, subsequent to the registration of the programme, the coordinating/managing entity has changed then the DOE who is undertaking the next inclusion of a CPA shall submit: (a) New letter(s) of authorization by each respective host party stating the change in coordinating/managing entity; (b) A confirmation from the new coordinating/managing entity that the PoA will be developed and implemented with the same set framework as originally described in the CDM-POA-DD; and (c) A validation opinion by a DOE regarding the compliance of the new coordinating/managing entity with the requirements of paragraph [10]15 (c) below.	NA	NA	NA	NA
	Comment:				

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3.5 [15]	**Requirements for the demonstration and assessment of additionality of emission reductions achieved under a PoA (EB 63, Annex 2)**				
	Requirements				
3.5.1 [15] 6	Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented CDM Project Activity (CPA) would occur.	[1,3]	DR	~~CAR 12~~ ~~CAR 16~~	OK
	Comment: CAR#12: Eligibility criteria 7 "*Shall the CPA meet the requirements pertaining to the demonstration of additionality laid forth in additionality-related guidelines, tools or any requirements embedded in the methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" version 13?*" is not appropriately formulated to justify the demonstration of additionality of each CPA to be included. CAR16: Additionality is provided at PoA level. The barriers have been checked and found real. Individual CPA additionality is addressed by eligibility criteria 7 and 8. It is unclear how compliance to criteria 7 will be proven and in particular how you justify criteria 8 regarding CPA 001. Particularly with regard to the fact that only one project site is known yet.				
3.5.2 [15] 7	PoAs that will include one or more micro scale projects as CPA shall include eligibility criteria derived from all the relevant requirements of the ""Guidelines for demonstrating additionality of micro scale project activities".	NA			**NA**
	Comment:				
3.5.3 [15] 8	PoAs that will include one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of Attachment A of Appendix B of the "Simplified modalities and procedures for small-scale CDM project activities".	[16-18]	DR	OK	OK
	Comment: Eligibility criteria for SSC are included.				
3.5.4 [15] 9	PoAs that will include one or more large-scale projects as CPA shall include eligibility criteria derived from all the relevant requirements contained in the additionality section of the large-scale methodology(ies).	[16-18]			**NA**
	Comment: Only SSC CPAs				
3.5.5 [15] 10	The CME shall demonstrate that compliance with the additionality-related eligibility criteria set in the PoA design document will ensure that all the relevant additionality-related guidelines, tools or any requirements embedded in the methodology(ies) are met.	[16-18]	DR	OK	OK
	Comment: OK				
3.5.5 [15] 11	The CME shall document the compliance with the eligibility criteria in each of the CPA design documents.	[16-18]	DR	~~CAR 17~~	OK
	Comment: CAR 17: Compliance with the eligibility criteria has not been documented in the specific CPA-DD				
3.5.5 [15] 12	For PoAs involving combinations of technologies/measures and/or methodologies, the eligibility criteria relative to each of them shall be proposed to demonstrate additionality. Types of combinations as indicated in paragraph 11(a) to 11(d) of the "Standard for application of multiple CDM methodologies for a PoA" shall be taken into account.	[16-18]	DR		**NA**
	Comment:				

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3.6 [15]	**Requirements for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA (EB 63, Annex 3)**				
	Definitions				
3.6.1 [15] 5	All definitions contained in "Procedures for registration of a programme of activities as a single CDM project activity and issuance of CERs for a PoA" are applicable.	[16-18]	DR	OK	OK
	Comment: Procedures for registration of a programme of activities as a single CDM project activity and issuance of CERs for a PoA" are applicable.				
	Requirements for the development of eligibility criteria (EB 65 Annex 3)				
3.6.2 [15] 6	The CMEs shall develop eligibility criteria for inclusion of a CPA under the PoA and shall include these criteria in the PoA design documents (CDM-PoA-DD, CDM-SSC-PoA-DD, CDM-PoA-DD-AR, or CDM-PoA-DD-SSC-AR) and demonstrate their usability to assess the inclusion of CPAs in the generic CDM-CPA-DD. As EB 65 (21-25 November 2011) approved a new PoA Standard its implications shall be followed in the PoA project documents unless the Host country LoA is obtained and the Validation is completed prior to that date.	[16-18]	DR	~~CAR 3~~	OK
	Comment: CAR#3: The proposed CME operational procedures does not sufficiently 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 (EB63, A3)., in particular when considering §9 and §13.The eligibility criteria have been updated to meet the requirements of EB65 Annex 3 para. 14 and 15. Due to a lack of justification (documented evidence) SQS is not able to assess the inclusion of CPA-001 to the PoA with the eligibility criteria listed in PoA-DD v.3.0 and the specific CPA-DD v.3.0. Therefore their usability as well as those of procedure CME 01/07 has not been demonstrated as per EB 65 Annex 3 para. 13.				
3.6.4 [15] 8	The validating DOE shall determine whether the eligibility criteria are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA.	[16-18]	DR	~~CAR 3~~	OK
	Comment: see CAR#3				

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3.6.5 [15] 9	The CMEs shall have the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the registered PoA. The CMEs shall develop and implement a management system that includes the following: 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 the DOE at the time of validation of the PoA; b. Records of arrangements for training and capacity development for personnel made available to the DOE at the time of validation of the PoA; c. Procedures for technical review of inclusion of CPAs made available to the DOE at the time of validation of the PoA; d. 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); e. Records and documentation control process for each CPA under the PoA, made available to the DOE at the time of request for inclusion of the CPA; f. Measures for continual improvements of the PoA management made available to the DOE at the time of validation of the PoA; g. Any other relevant elements.	[16-18]	DR,I	~~CAR 3 CL 18~~	OK
Comment:	CL18: It is unclear how the CME shall have control over each CPA. The Monitoring/ Scrapping/ Financing role in this regard is not clear. Especially as this entity is "not to disclose". What happens if this entity will claim that the monitoring is OK? Who has control? Please describe the situation clearly. See also CAR#3 above.				
3.6.6 [15] 10	The DOE shall assess the elements of the management system referred to in paragraph 9 as part of the validation of the PoA or as part of the validation of the CPA inclusion.	[16-18]	DR	~~CAR 3~~	OK
Comment:	The management system has been assessed. All weak points have been addressed by CAR 3.				
3.6.7 [15] 11	The CPAs shall be included in the PoA on the basis that the DOE has confirmed the eligibility of CPAs, where applicable undertaking sample-based checks in accordance with approved guidelines/standard from the Board.	[16-18]	DR	OK	OK
Comment:	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 EB 68 Annex 27. Based on the assessment (see VR) 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.				
3.6.8 [15] 12	In the case of PoAs involving combinations of technologies/measures and/or methodologies, distinct eligibility criteria shall be proposed per combination applied as indicated in paragraph 11(a) to 11(d) of the “”Standard for application of multiple CDM methodologies for a programme of activities”.				**NA**
Comment:					

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3.6.9 [15] 13	The eligibility criteria shall cover as a minimum the following: a. The geographical boundary of the CPA including any time-induced boundary 2 consistent with the geographical boundary set in the PoA; b. Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo); c. The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications; d. Conditions to check the start date of the CPA through documentary evidence; e. Conditions that ensure compliance with applicability and other requirements of single or multiple methodology/ies applied by CPAs; f. The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality (please refer to the latest approved version of the Standard for demonstration of additionality of a programme of activities"); g. The PoA-specific requirements stipulated by the CMEs including any conditions related to undertaking local stakeholder consultations and environmental impact analysis; h. Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation); i. Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys; j. Where applicable, the conditions that ensure that CPA in aggregate meets the small-scale or micro-scale threshold criteria (please refer to the latest approved version of the "Guidelines for demonstrating additionality of microscale project activities" and the latest approved version of the "General Guidelines to SSC CDM methodologies") and remain within those thresholds throughout the crediting period of the CPA; k. Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories (please refer to the latest approved version of the "Guidelines on assessment of debundling for SSC project activities"); l. Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance. Note that the validating DOE and/or the CDM Executive Board may specify additional criteria depending on the specific characteristics of a PoA. For example, an emission factor for electricity generation is dependent on the boundaries of regional or state or sub-regional grids.	[16-18]	DR		
Comment:					

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	Requirements for updating eligibility criteria				
3.6.2 [15] 14	If the version of methodology/ies applied by the PoA is revised or replaced, subsequent to being placed on hold, CMEs shall update the eligibility criteria to the requirements of the revised or new methodology/ies with immediate effect and include them in a new version of the PoA DD (e.g. version 1.1) and new generic CDM-CPA-DD validated 5 by a DOE, and shall submit it to the Board for approval. a. Once changes have been approved by the Board, the inclusion of all new CPAs shall be based on the updated eligibility criteria applying the new generic CDM-CPA-DD; b. CPAs that were included before the methodology was put on hold shall apply the revised version of the generic CDM-CPA-DD only at the time of the renewal of the crediting period.	[16-18]	DR		**NA**
3.6.2 [15] 15	No action is required if the version of methodology/ies applied by the PoA is revised without being placed on hold or is withdrawn for the purpose of inclusion in a consolidated methodology/ies unless otherwise indicated in the respective report of the meeting of the Board that has approved the new methodology/ies.	[16-18]	DR		**NA**
3.6.2 [15] 16	If the boundary of the PoA is amended post-registration to expand the geographic coverage or to include an additional host party/ies, the CMEs shall update the eligibility criteria to reflect the consequent changes and include them in a new version of the PoA DD (e.g. version 1.2) and new generic CDM-CPA-DD validated by a DOE, and shall submit it to the Board for approval. a. Once changes have been approved by the Board, the inclusion of all new CPAs shall be based on the updated eligibility criteria applying the new generic CDM-CPA-DD; b. CPAs that were included before the boundary of the PoA was amended shall apply the revised eligibility criteria only at the time of the renewal of the crediting period.	[16-18]	DR		**NA**
3.6.2 [15] 17	The revision of eligibility criteria of a registered PoA may be initiated by the Board at any time during the lifetime of the PoA if any significant problem is identified. a. In case the revision of the eligibility criteria of a PoA is requested by the Board, the CME shall update them to reflect the consequent changes and include them in a new version of the PoA DD (e.g. version 1.2) and new generic CDM-CPA-DD validated by a DOE, and shall submit it to the Board for approval; b. Once changes have been approved by the Board, the inclusion of all new CPAs shall be based on the updated eligibility criteria applying the new generic CDM-CPA-DD; c. CPAs that were included before the revision of the eligibility criteria shall apply the revised eligibility criteria only at the time of the renewal of the crediting period.	[16-18]	DR		**NA**
3.6.2 [15] 18	At the renewal of the crediting period of a PoA (at the renewal of the first CPA), the CMEs shall update the eligibility criteria as per the latest revised applicable methodology/ies and include them in a new version of the PoA DD (e.g. version 1.3) and new generic CDM-CPA-DD validated by a DOE, and shall submit it to the Board for approval. a. Once changes have been approved by the Board, the inclusion of all new CPAs shall be based on the revised eligibility criteria; b. The subsequent CPAs requesting the renewal of the crediting period shall apply the revised version of the generic CDM-CPA-DD.	[16-18]	DR		**NA**

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3.7 [15]	**Requirements for application of multiple CDM Methodologies for a PoA (EB 63, Annex 4)**				
	General Requirements				
3.7.1 [15] 8	The CME shall list in the PoA- design document (PoA-DD) and the generic CPA-DD various combinations of technologies/measures and/or approved methodologies that will be implemented in the PoA.	[16-18]	DR		**NA**
	Comment:				
3.7.2 [15] 9	The CME shall define the eligibility criteria for CPA inclusion and, where applicable, sampling plans for each of the combinations separately according to the "Standard for the development of eligibility criteria for the inclusion of a project activity as a CPA under the PoA" and a standard or guideline approved by the Board for sampling and surveys for CDM project activities and Programme of Activities. If a CPA uses technologies/measures from several methodologies, it shall be in compliance with all the eligibility criteria derived from the requirements of all the methodologies. These eligibility criteria shall be identified in the validated PoA-DD.	[16-18]	DR		**NA**
	Application of multiple small-scale (SSC) CDM methodologies				
3.7.3 [15 10	Combinations of technologies/measures and/or methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technology(ies)/measures applied. Where such cross effects do exist, the CME shall propose methods to account for such cross effects using the "Procedures for requests to the executive board for deviation from an approved methodology" so as to ensure that the calculation of emission reductions is accurate.	[16-18]	DR		**NA**

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3.7.4 [15] 11	In particular, the following situations for applying combinations of technologies/measures and/or methodologies are eligible: a. The same combination of technologies/measures under the same combination of methodologies applied consistently in each and every CPA of a PoA. For example, methane recovered from an anaerobic digester to treat animal manure under AMS-III.D is used for heat generation applying AMS-I.C; b. A single methodology is consistently applied in each CPA of a PoA but using multiple technology(ies)/measures. For example, different waste water treatment technologies can be applied across CPAs of one PoA, using AMS-III.H; c. A principle technology/measure is applied consistently in each CPA using multiple combinations of methodologies. For example, waste water treatment projects with different ways of utilizing recovered methane (AMS-I.C for heat, AMS-I.D and AMS-I.F for electricity, or both), biomass/biogas projects with different fuel displacement (AMS-I.C and AMS-I.I for fossil fuel, AMS-I.E for non-renewable biomass, or both); d. Combinations of technologies/measures and methodologies vary across CPAs of a PoA, i.e. the policy or goal can only be realized through the use of multiple and disparate methodologies. Therefore in such situations the CME shall demonstrate that the implementation of the activities is integrated through the design of the programme. This may include, for example, a range of activities within different sectors such as energy generation (e.g. wind electricity using AMS-I.D, solar water heaters using AMS-I.J), energy efficiency (e.g. efficient lighting using AMS-II.J, building energy efficiency using AMS-III.AE, efficient street lighting using AMS-II.L), water management (e.g. efficient irrigation), waste management (e.g. landfill gas recovery using AMS-III.G, composting using AMS-III.F, recycling using AMS-III.AJ), transport (e.g. using AMS-III.C) and agriculture (using AMS-III.D for manure management).	[16-18]	DR		**NA**
3.7.5 [15] 12	The CME may optionally use the "Procedure for the submission and consideration of request for clarification on the application of approved small scale methodologies" (EB 34, annex 6) 5 to seek clarifications on cross effects in the proposed combinations. CDM-POA-DD and CDM-CPA-DD are presented with completed sections for detailed technical descriptions. Where possible, these requests shall be treated under "fast track procedures" (see paragraph 8 of the same procedure, EB 34, annex 6) and the response shall be provided within four weeks.	[16-18]	DR		**NA**
3.7.6 [15] 13	The compliance with the SSC threshold of a CPA shall be met by following the guideline in paragraph 3 of the "General Guidelines to SSC CDM methodologies".	[16-18]	DR		**NA**
	Application of multiple large-scale CDM methodologies				

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3.7.7 [15] 14	For PoAs applying large-scale CDM methodologies, only combinations explicitly permitted in the methodologies can be applied without pre-approval. 6 In other cases, the CMEs shall seek a clarification by following the "Procedure for the submission and consideration of queries regarding the application of approved methodologies and methodological tools by designated operational entities to the Meth Panel" 7 (EB 42, annex 9) for the eligibility of the proposed combination.	[16-18]	DR		**NA**
	Application of combination of multiple large- and small-scale CDM methodologies				
3.6.8 [15] 15	In case of a combination of multiple large- and small-scale CDM methodologies in a PoA, the same procedures detailed in section C shall be applied.	[16-18]	DR		**NA**

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Protocol 2: Summary of Requests*

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

No.:	CAR 1	Reference:	A.2. SSC PoA description, E.4 Baseline scenario identification
Validator request	Greenfield activities: The operationalisation to determine the "most conservative common practice" (see CME OM, p.12 etc.) is not adequately provided. There is no adequate clear procedure for the establishment of the baseline for all potential or targeted greenfield activities (incl. targeted lightning areas, criteria, database with least electricity consuming available non–LED lightning equipment (lecaNotLEDle) that determines how the light output service level in Lux as recommended for the application in question by national standard and/or code [CFL xWatt for xLux @targeted lightning area z listed in national lightning code page xx], template form etc.) would be provided. The proposed unclear procedure is even not applied at site 1 of CPA1. Furthermore, it is not clear how it would be ensured that the recommended standard would have been applied (to avoid overestimation of baseline emissions) and how do you account for general and or specific market segment increases of LED penetration rate over time that are not induced by the PoA ? Lastly, when referring to greenfield activities "at locations where LED equipment is not the common practice" (PoA-DD, v02, p.7; but also p.15) the latest guidance on common practice (EB63, Annex 12) has not been referenced.		
Project participant response:	All LED lighting equipment under the PoA will fall into one of the four strata: IL, IH, OL, OH identified in the table below Table 1: Lamp classification **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) The procedure for establishment of a conservative baseline for greenfield projects is as follows (see also CME/02/08): Step 1: identify classification of lamp, in line with the above table. Step 2: identify lumens for targeted lighting areas according to national lighting code: indoor (= part 5 interior illumination) or outdoor (= part 6 exterior illumination, part 7 hazardous areas, and part 8 Road lighting). Example: (See FRSD_6_National_Lighting_Code_India_2010 Table 2 page 108. Canteens require an average illumination of 150 lux. Step 3: determine most efficient (Watt) available non-LED lighting equipment that would fulfil the service level. This is to be based on independent expert opinion, or lamp specifications as included in an official quotation, based on a request to install the most efficient non-LED lighting equipment. Lux cannot be converted to Watt by a straightforward conversion factor. Lux is a unit for measuring the illumination (luminance) of a surface. It is the amount of light received per unit of surface area, 1 lux equals 1 lumen per square meter. The Lux is a photometric unit, rather than a radiometric unit, which means that it takes into account the basic physics of energy and radiation, but also includes the physics of the human eye. Our eyes are simply better at picking up some colours than others. For instance, 1 Watt of yellow light would look a whole lot brighter (be absorbed more efficiently by		

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	the eye) than 1 Watt of blue light[1]. So the wattage of LED lighting equipment is a property of the lighting equipment and relates to LED efficiency. As an example a current generation can produce over 100 lumens on 1 watt of power. A previous generation might only do 40 lumens for 1 watt of power. The national lighting code is the best available reference benchmark for illumination levels in India. The lighting code has been developed by many stakeholders from the lighting industry (see also answer considering lighting code under CL7). The proposed procedure is not applied at the first end-user under CPA-001, as this considers a brownfield activity. The latest guidance on common practice has been included in the POA-DD.	
Validator request:	The national lighting code is in line with the requirements of EB61, Annex 21 para. 9. The procedure is OK but Step 3 CME/02/08 need further clarification: - How can you ensure that expert opinion on baseline equipment is independent? How can you assure that expertise is done prior to include the potential site to a CPA. - It is unclear how the steps delineated in CME/02/08 will be recorded for monitoring and verification purposes.	
Project participant response:	Procedure CME/02/08 in the CME operational manual has been updated as CME/03/08. The following text has been added to step 4: "This is to be supported for each site with a formal quotation from either a lighting equipment supplier or a lighting equipment manufacturer".	
Validator conclusion:	CME/02/08 addresses project sites only, but not the types of lamps that would be used in the baseline scenario. Since there is no real greenfield site available at time of validation, SQS is not able to validate whether such a quotation reflects an independent opinion.	
Project participant response:	The project participants have changed the final step of procedure CME/02/08 for the baseline of Greenfield sites. Instead of using a quotation from a lighting equipment supplier, or independent opinion, the project participants have included the guidance from AMS II-L *Demand-side activities for efficient outdoor and street lighting technologies* (version 01) for Greenfield sites. In addition to the requirement that the baseline lighting equipment lux is identified based on the lux for targeted lighting areas according to the National Indian Lighting Code (step B CME/02/08) step C of the procedure has been changed to: "*Determine most efficient (Watt) available non-LED lighting equipment that would fulfil the service level. 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. 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.*" This procedure has also been included under Section E.4 of the PoA-DD.	
Validator conclusion:	The proposed approach and the procedure to determine the baseline scenario in case of Greenfield activities provides a verifiable documentation of each greenfield site. Using another approved meth. as an additional guidance is deemed as an appropriate way to resolve the CAR. The proposed procedure is in accordance with AMS II-L. CAR closed.	Date: 30/04/2012

No.:	CAR 2	Reference:	A.2. SSC PoA description, C Environmental analysis
Validator request (round 2 – CAR2):	There is no detailed procedure provided for collecting and/or storing, including scrapping that allows for monitoring and verification by the DOE as required by AMS-II.C.,V13, §17 to allow for		

[1] http://www.physlink.com/education/askexperts/ae409.cfm

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	neglectance of leakage. Please ensure that this procedure determines in detail the roles and responsibilities, incl. CME and provides assurance that future legislation on electronic waste of replaced lamps is respected in line with PoA-DD, p. 4 and that legal compliance can be regularly verified by a DOE.	
Project participant response:	The 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/02/12 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.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CAR 3	Reference:	A.4.2.2. Eligibility criteria
Validator request:	The proposed CME operational procedures does not sufficiently 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 (EB63, A3), in particular when considering §9 and §13. Furthermore, not all forms and fully detailed templates, incl. contractual agreements to be applied in line with the operational procedures to enable DOE's assessment of the management system have been provided.		
Project participant response:	The document to which is referred in CL4, EB63, Annex 3 has been superseded by EB 65, Annex 3, STANDARD FOR DEMONSTRATION OF ADDITIONALITY, and DEVELOPMENT OF ELIGIBILITY CRITERIA AND APPLICATION OF MULTIPLE METHODOLOGIES FOR PROGRAMME OF ACTIVITIES (Version 01.0). Thus, EB 63, Annex 3, paragraph 9 has been replaced with EB 65, Annex 3, paragraph 17 and EB 63, Annex 3, paragraph 13 has been replaced with EB 65, Annex 3, paragraph 14. In light of the above, in our response to CL4, we propose to refer to EB 65, Annex 3. EB 65, Annex 3, paragraph 17: The CME shall have the competencies to check the features of potential CPAs and ensure that each CPA meets all requirements and eligibility criteria before inclusion in the registered PoA. The CME shall develop and implement a management system that includes the following made available to the DOE at the time of validation of the PoA: (a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies; In the CME Operational Manual, also see the following procedure: RESPONSIBILITIES AND DUTIES OF VARIOUS PARTIES INVOLVED IN THE PoA AND/OR CPAs UNDER THE PoA — CME/02/05 (b) Records of arrangements for training and capacity development for personnel; Please refer to the following procedure in the CME Operational Manual:		

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ARRANGEMENTS FOR TRAINING AND CAPACITY DEVELOPMENT FOR PERSONNEL	CME/02/22

(c) Procedures for technical review of inclusion of CPAs;
Please refer to the following procedures in the CME Operational Manual:

PROCEDURE FOR CHECKING THE ELIGIBILITY CRITERIA FOR CPAs AND INCLUSION IN THE PoA	CME/01/07
TEMPLATE CPA ELIGIBILITY CHECK REPORT	CME/02/16

(d) 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);
Please refer to the following procedures in the CME Operational Manual:

PROCEDURE FOR ISSUE OF UNIQUE ID FOR CPAs AND UPDATING OF CPA LIST	CME/01/06
PROCEDURE FOR CHECKING THE ELIGIBILITY CRITERIA FOR CPAs AND INCLUSION IN THE PoA	CME/01/07
TEMPLATE CPA ELIGIBILITY CHECK REPORT	CME/02/16
PROCEDURE TO DETERMINE THE RELEVANT GRID EMISSION FACTOR FOR LED LIGHTING EQUIPMENT	CME/02/24
PROCEDURE TO DETERMINE THE TRANSMISSION AND DISTRIBUTION LOSSES FOR LED LIGHTING EQUIPMENT	CME/02/25

(e) Records and documentation control process for each CPA under the PoA;
Please refer to the CME Operational Manual, especially the following procedures and templates:

PROCEDURE FOR DOCUMENT CONTROL	CME/01/03
PROCEDURE FOR REVISION OF PoA DOCUMENTS AND CPA MONITORING RECORD	CME/01/04
PROCEDURE FOR ISSUE OF UNIQUE ID FOR CPAs AND UPDATING OF CPA LIST	CME/01/06
PROCEDURE FOR CHECKING THE ELIGIBILITY CRITERIA FOR CPAs AND INCLUSION IN THE PoA	CME/01/07
PROCEDURE FOR DETERMINING THE MOST CONSERVATIVE COMMON PRACTICE AS THE BASELINE SCENARIO – FOR GREENFIELD ACTIVITIES	CME/02/08
PROCEDURE FOR DETERMINING STRATIFICATION OF LED LIGHTING EQUIPMENT INSTALLED UNDER THE PoA	CME/01/09
PROCEDURE FOR PREPARING CPAs FOR START OF MONITORING OF PROJECT EMISSIONS	CME/01/10
PROCEDURE FOR MONITORING OF THE CPAs	CME/02/11
PROCEDURE FOR SCRAPPING OF REPLACED EQUIPMENT	CME/02/12
PROCEDURE FOR PREPARING MONITORING REPORTS ON EMISSION REDUCTIONS AND REQUEST	CME/01/13

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FOR VERIFICATION	
TEMPLATE CPA ELIGIBILITY CHECK REPORT	CME/02/16
WAIVER TEMPLATE	CME/01/17
TEMPLATE END-USER OLD LAMP DATA	CME/01/18
TEMPLATE IDENTIFIED LED EQUIPMENT DATA	CME/02/19
TEMPLATE LAMP REPLACEMENT DATA	CME/02/20
TEMPLATE METER DATABASE	CME/02/21

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(f) Measures for continuous improvements of the PoA management system;

PROCEDURE FOR MEASURES FOR CONTINUOUS IMPROVEMENTS OF THE POA MANAGEMENT	CME/02/23

(g) Any other relevant elements.
Please refer to the following elements in the CME Operational Manual.

TABLE OF CONTENTS	CME/02/01
LIST OF ABBREVIATIONS	CME/01/02
PROCEDURE FOR COMMUNICATION WITH CDM EXECUTIVE BOARD	CME/01/14
PROCEDURE FOR FORWARDING OF CERs	CME/01/15

Considering EB 65, Annex 3, paragraph 14 (eligibility criteria for the PoA), the Project Participants have made the following changes. The DD's have been updated accordingly.

EB65, Annex 3, para 14	No	Eligibility Criteria	Compulsory answer
(a) The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	1	Does the CPA regard solely distribution within the programme's geographic boundary as defined in the SSC-PoA-DD?	YES
(b) Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	2	Shall the end user locations be uniquely identifiable by address and/or unique location description to avoid double-counting of emission reductions?	YES
	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
(c) The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	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.)?	YES
(d) Conditions to check the start date of the CPA through documentary evidence;	5	Has the CPA provided a forecast concerning the CPA start date supported through documentary	YES

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			evidence?	
	(e) Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	6	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
	(f) The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified in Section A above;	7	Shall the CPA meet the requirements pertaining to the demonstration of additionality laid forth in additionality-related guidelines, tools or any requirements embedded in the methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" version 13?	YES
		8	Does the CPA rule out including facilities that are covered by an enforced government policy that includes mandatory adoption of LED lighting equipment?	YES
	(g) The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;		As the Stakeholder Consultation and the Environmental Impact analysis is not required on a CPA level, no eligibility criteria considering this point have been included.	
	(h) Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance;	9	Has the owner of the CPA provided an affirmation that funding from Annex I a party, if any, does not result in a diversion of official development assistance?	YES
	(i) Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);	10	Does the CPA involve the installation of LED lighting equipment for grid-connected use in publicly, commercially, industrially or otherwise employed locations?	YES
	(j) Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;	11	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' (version 02.0), EB 65, Annex 2?	YES
	(k) Where applicable, the conditions that ensure that	12	Will the energy savings be capped at 60 GWh/per year?	YES

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	every CPA in aggregate meets the small-scale or micro scale threshold criteria and remains within those thresholds throughout the crediting period of the CPA;			
	(l) Where applicable, the requirements for the Debundling check, in case CPAs belong to small-scale (SSC) or micro scale project categories.		Not Applicable	

Validator request:	Not OK. CME Operational Manual version 2.0 is incomplete. Most of the procedures listed above cannot be found. SQS is therefore unable to validate CME's/ PoA-DDs compliance with EB 65, Annex 3. <u>Eligibility criteria:</u> Due to a lack of documented justification of how the CPA meets the criteria listed in the PoA-DD SQS is not able to assess the inclusion of CPA-001 to the PoA. The usability of the proposed criteria as well as those of procedure CME 01/07 has not been demonstrated as per EB 65, Annex 3 para. 13.
Project participant response:	The completed and signed Eligibility check report for CPA-001 has now been added as supporting document TRSD_05_CPA-001_Eligibility_Check_Report. The signed CER waiver from the first foreseen end-user under of CPA-001 has been added as supporting document TRSD_04_Waiver_CERs_signed. TRSD_02_Database_CME_operational_manual_procedures_v_1_0 is the basic structure (to be used for clarification) of a database that will be developed by the monitoring entity. The templates presented in the manual will be used during the installation of the LED lighting equipment, as per procedure CME/01/10. The data needs to be digitalized and entered into the database.
Validator conclusion:	OK — Date: 05/03/2012

No.:	CAR 4	Reference:	A.4.4.2. Monitoring plan
Validator request:	Graphical process chart specifying all monitored parameters for all strata for a specific CPA with different locations is not provided yet. Is unclear what national standards and norms will be applied. Not all procedures provide specific measures that ensure proper QA/QC.		
Project participant response:	A Graphical process specifying all monitored parameters for all strata for a specific CPA with different locations has been included in the CME operational manual (CME/02/11, page 23 &24). The national lighting code 2010 (sp 72: 2010) (NLC) is an official publication of the Bureau of Indian Standards. This Bureau is the national Standards Body of India working under the aegis of Ministry of Consumer Affairs, Food & Public Distribution. The intent of the NLC code is to encourage good lighting practices and systems which would minimize light pollution, glare, light trespass and conserve energy while maintaining safety, security, utility and productivity. It was developed with the input from all relevant stakeholders in the lighting industry, including government, testing laboratories, manufacturers. (See FRSD_6_National_Lighting_Code_India_2010 page v). Hence it is justified to use the NLC as the reference benchmark for illumination levels in India		

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	Considering the baseline for greenfield activities see PP's response under CAR 1. Considering the Quality Assurance and Quality Control the project participants have provided further details on the QA/QC of the monitored parameters as included under Section E.7.1. ID.9. Operating hours → The preferred monitoring entity has prepared a detailed report on quality assurance and quality control of the operating hours in a separate document. This document SRSD_01_Monitoring_Software has been submitted as part of the answers to this validation protocol. On page 3 and 4 of this document is stated that all data entries will be checked on validity and correctness. On page 6 to 10 is explained how to deal with exceptions and errors in the data entry. In the CME operational manual a procedure has been included for the execution of the surveys (Procedure for monitoring of the CPAs CME/02/11), relevant for the establishment of ID. 10 and ID. 11. In the section below the QA/QC procedure as included in the DDs is presented. ID.10. Mean annual failure rate of the installed LED equipment. 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. ID.11. Outage factor The average time elapsed between failure of LED lamps and their replacement divided by the annual operating hours of the metered lamp. The survey will consist of identifying LED lighting equipment, based on their ,exact installation location' that are installed and have been replaced during the monitoring period. LED lighting equipment cannot be replaced as part of the survey process and counted as operating.		
Validator conclusion:	OK	Date:	21/01/2012

No.:	CAR 5	Reference:	A.4.4.2. Monitoring plan, E.6.2. Equations, incl. fixed parameters
Validator request (round 2 – CAR5):	There is insufficient detail on the proposed stratification as the four clusters are not properly reflected in the setup of specific CPA, incl. monitoring, operational manual and forms. Furthermore, the specifications of the technologies including the level and type of services and the performance specifications including compliance with testing/certification are not clear (EB63, A3: standard for eligibility criteria, §13c). It remains unclear which type of LED lamp (Watt) may/will replace which type of non-LED lamp (Watt) and how the same service level (lux/m^2) is ensured and verified. A simple comprising of watt is not traceable and makes the assessment of greenfield activities impossible. Finally, the latest upcoming guidance on sampling (currently under finalisation) has not been referenced. Please see: => http://cdm.unfccc.int/public_inputs/2011/eb63_05/draft_standard_sampling.pdf		
Project participant response:	For brownfield the replacements will happen, based on a commercial deal. Contrary to CFL programmes, where lights are distributed for free, or at a large discount. The to be installed LED lighting equipment must meet the end-users (buyers) requirements. They will, or often cannot accept a lower service level. They are prepared to make a significant investment and want to receive true value for their money.		

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	The service levels as applied for brownfield are based on the replacement service levels, as provided by the manufacturer. As there is no global, or Indian specific standard for LED lighting service levels the commercial service level as provided by the manufacture are the best available source to compare with baseline service levels. The latest standard for sampling and surveys for CDM project activities and PoAs (EB 65, Annex 2) has been included in the PoA-DD (Section A.4.4.2 section on sampling plan). The proposed stratification is explained in the sampling plan (POA-DD A.4.4.2, and the specific CPA-DD B.6.1). Furthermore the stratification are included in the monitoring templates, as provided in the CME manual procedures CME/02/19, CME/02/20 and CME/02/21.
Validator request:	Source of Equation 1 (p.24 PoA-DD) as well as its appropriateness to estimate the sample size is unclear. SQS is not able to reproduce the sample size calculation in order to validate the proposed sample size. Please refer to source and provide further detail on the procedures to determine the required (considering SSC criteria) sample size as well as measures to ensure that samples are randomly selected and are representative of the population.
Project participant response:	Due to an absence of our original statistical expert, the PPs could not find this source. Hence equation 1 has been replaced by a detailed description on the calculation of the required sample size. This can be found under Annex 4 (Monitoring). Furthermore the sample size has been crossed checked using statistical software, as per EB 65, Annex 2, para 11. The samples are randomly selected from the population. The monitoring entity will select the LED lighting equipment that are to be metered using statistical software: http://stattrek.com/Tables/Random.aspx . The Monitoring entity will keep a logbook on the random sampling. The basic structure of the logbook is provided to the DOE as TRSD_18_Random_sample_selection. Here is described how random samples will be selected and representativeness is safe guarded. Representativeness of the population is assured due to 're-distribution' of some of the installed meters. This is described in the CME operational manual CME/02/11: Procedure for monitoring of the CPAs; under the heading 'random sampling'. This procedure is applied in supporting document TRSD_18_Random_sample_selection. Also screenshots have been included from the statistical software.
Validator conclusion:	Not OK. The requirements of the latest standard for sampling and surveys for CDM project activities and PoAs (EB 65, Annex 2) are not met.: Date: 15/03/2012
Project participant response:	To better align the PoA-DD with the latest standard for sampling and surveys for CDM project activities and PoAs (EB 65, Annex 2) The Project Participants have included the following: 1. In order to avoid biases and potential seasonal effects the following guidelines are to be observed for the non-metered sampling survey (Section E.7.1, parameter $S_{non\text{-}metered,k}$): • Survey to determine the failure rate are to be undertaken for each stratum of LEDs installed under the specific CPA. • Timing & Frequency: surveys are to be done once in 6 months, starting after start date of the respective CPA 2. The procedure to deal with case of non-response and data gaps are described under: SD_29_LEDs_Save_Energy_Monitoring_overview_Joshi_Electronics (page 6 & 11,12). Furthermore all efforts shall be made to retrieve valid data collected but not transmitted. In case if it is not possible, this metering sample will be excluded. This will reduce the number of metred lighting equipment and the average number of meters in use. This will affect the confidence interval by reducing the net average usage hours. Hence this is conservative. 3. Following the changes resulting from EB 65, Annex 2. The procedure for defining outliers is no longer required, as this has been removed from the PoA-DD (see also point 8 & 9). The procedure for replacement of meters (in case of failure) is described under

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SD_29_LEDs_Save_Energy_Monitoring_overview_Joshi_Electronics (page 13, Exceptions and errors)

4. The sampling plan will be implemented after the first LEDs are installed. The skills and resources needed for the monitoring have to be provided by the Monitoring Entity. This company is to be contracted by the CME. For now it is expected that Joshi Electronics & Electricals will be the Monitoring Entity. The skills and resources were validated by the DOE during the on site visit. A draft MoU between the CME and Monitoring Entity has been provided (SD_27_LEDs_Save_Energy_Draft_MoU_SA_MCI_Joshi_17062011).

5. The procedure to determine the required sample size has been updated (see Annex 4 of the PoA-DD). Furthermore the establishment of the sample size has been moved from the PoA-DD to the CPA-DD.

- The random number are selected using statistical software: http://stattrek.com/statistics/random-number-generator.aspx
- How random numbers are assigned to unique IDs is described in document: TRSD_18_Random sample selection

6. The variables b (operating hours) and c (failure rate) refer to the bullets above the indicated sections.

7. This statement is taken from per EB 65 – Annex 2 Standard for Sampling and Surveys for CDM project activities and programme of activities. (Para 9). This can be used as there is no specific guidance in AMS II-C (version 13).

8. The formulas have been updated according to EB 66 – proposed agenda Annex 27 Draft best practices examples focusing on sample size and reliability calculations.

equation 7

Where:

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

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

equation 8

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

* 20,000 is based on varying N, obtained by filling in equation 7. If N increase over 20,000 no changes occur in the number of samples. And statistical software http://www.raosoft.com/samplesize.html that states under 'what is the population size' : If you don't know, use 20,000.
The choice of 20,000 is further clarified by filling equation 7 with varying population size. After 20,000 the required sample size does no no longer increases.

Furthermore the actual establishment of the sample size has been moved from the PoA-DD to the CPA-DD. The guidance on how to calculate the size has been maintained in the PoA-DD under Annex 4.

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	9. Annex 4 has been updated following the latest EB guidance (proposed agenda EB66, Annex 27). More specific: Reference to SE has been removed. The indicated table is an example to demonstrate that the required sample size does no longer increase, if the population grows. Values are obtained from equation 7. This has been clarified under Annex 4. 10. This section has been updated. The reference to "General Guidelines for Sampling and Surveys for SSC project activities" has been replaced by "the guidance per this PoA-DD". Actual sample size is to be determined per stratum, per CPA-DD. 11. This section has been updated. The reference to "General Guidelines for Sampling and Surveys for SSC project activities" has been replaced by "the guidance per this PoA-DD". Actual sample size is to be determined per stratum, per CPA-DD.	
Validator conclusion:	OK	Date: 09/05/2012

No.:	CAR 6	Reference:	PoA-DD, CPA-DD
Validator request (round 2 – CAR2):	Several equations have no sources and/or cannot be read due to low quality in presentation (PoA-DD, p.30ff.). Some pages contadin typos (PoA-DD, p. 34f./40; CPA-DD, p.7f.). Table 9 in CPA-DD is double. Links to webpages have been removed or are missing. Exact scientific approach to references is not consistently applied.		
Project participant response:	The PoA-DD and CPA-DDs have been updated accordingly. Furthermore the Tables considering parameters monitored during the crediting period have been updated, as the used format was not correct. Also the overview tables with the overview of the emission reductions and gases included in the project boundary have been updated to the correct template.		
Validator request:	DDs have been amended, but on page 8 of specific CPA-DD there is a still reference source missing.		
Project participant response:	The reference has been added and the passage now reads as follows: "The currently installed equipment and their replacement are listed in table 5 below"		
Validator request:	OK, but Standards and Guidelines etc. used in the PoA-DD and CPA-DDs are not reflecting the presently valid status (15.10.2012).		
Project participant response:	DDs have been amended reflecting the presently valid status of Standards, Tools and Guidelines		
Validator conclusion:	OK	Date: 17/10/2012	

No.:	CAR 7	Reference:	E. Justification of the meth applicability
Validator request:	It is unclear how comparability of service level is ensured for greenfield activities (which current lamps (with what lumen and watt) would be replaced with what LED lamps (lumen and watt) to ensure compliance with the National Lightning Code 2010 (lux/m^2).		
Project participant response:	The comparability of service levels and the compliance with the National Lighting Code has been explained under CAR1, CAR4		
Validator conclusion:	OK	Date:	23/01/2012

No.:	CAR 8	Reference:	A.4.4. Operational, management and monitoring plan for the PoA
Validator request:	With regard the operational and management plan: The set of forms are incomplete and do not		

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	contain all relevant details that allow for direct application and electronic search (e.g. all stratification groups, exact full wording etc.).
Project participant response:	In the CME operational manual the following procedure have been updated: - The template lamp replacement date (CME/02/20). - Procedure for determining the most conservative common practice as the baseline scenario – for greenfield activities (CME/02/08). A form to track replaced lamps from point of use to scrapping entity, has been included in procedure for scrapping of replaced equipment (CME/02/12), page 31.
Validator request:	Not OK. CME Operational Manual version 2.0 is incomplete. Please ensure that all procedures as listed in the table of content and all templates/ forms are included in the manual.
Project participant response:	The complete version of the manual has been made available to the DOE.
Validator conclusion:	OK Date: 05/03/2012

No.:	CAR#9	Reference: A.3.Assessment & demonstration of additionality, CPA: A.4.1.1. Host Party(ies)
Validator request:	a) Please provide the appropriate letters of approval. b) Please provide CME letter of authorization from host party of the PoA	
Project participant response:	The Dutch LoA has been issued and has been included in the supporting documents as SRSD_05_Dutch_LoA The Indian LoA request is currently being processed; the project participants are awaiting feedback from the National CDM Authority (Indian DNA).	
Validator conclusion:	OK, All LoAs submitted to DOE.	Date: 17/10/2012

No.:	CAR 10	Reference: MoC
Validator request:	There is no full consistency in names in the draft MoC and signed versions are missing.	
Project participant response:	Signed version of the Modalities of Communications (MoCs) is provided as supporting document SRSD_06_MoC_LEDs_save_energy.	
Validator conclusion:	OK	Date: 17/10/2012

No.:	CAR 11	Reference: A.4.2.2.; E.2.
Validator request:	An applicability criterion (c) has not been addressed as an eligibility criterion to include a CPA to the PoA framework.	
Project participant response:	The criterion specified in §3(c) of EB65, Annex 3 has now been addressed by an added eligibility criterion with co compulsory answer "YES", which is the new criterion question #5, which reads as follows: "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?" It is noted that after adding the new criterion as #5, the numbering of existing eligibility criteria has been adjusted accordingly. Also, the CME operational manual, procedure CME/02/16 has been updated accordingly as CME/03/16.	

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Validator conclusion:	OK	Date: 05/03/2012

No.:	CAR 12	Reference: A.4.2.2, CME 01/07
Validator request:	Eligibility criteria 7 "*Shall the CPA meet the requirements pertaining to the demonstration of additionality laid forth in additionality-related guidelines, tools or any requirements embedded in the methodology AMS-II.C "Demand-side energy efficiency activities for specific technologies" version 13?*" is not appropriately formulated to justify the demonstration of additionality of each CPA to be included.	
Project participant response:	The criterion specified in §3(c) of EB65, Annex 3 has now been addressed by adjusting the eligibility criterion related to additionality (#8 in version 03 of the PDDs and now #9 in version 04 of the PDDs) with compulsory answer "YES", which reads as follows: "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)?" Also, the text related to compliance with the applicability criteria of methodology AMS-II.Cv13 has been separated from the additionality criterion and has been rephrased as eligibility criterion #8, which now reads as follows: "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?" Furthermore, in the CME operational manual, the procedure CME/02/16 has been updated as CME/03/16 to make it consistent with the changes to the eligibility criteria as described above (in reply to CAR 12). Finally, also in the CME operational manual, the Annex 2 of the revised procedure CME/03/16 now requires prospective CPA owners to indicate what favourable condition(s) they will offer to end-users to be included in their CPAs.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CAR 13	Reference: CP-DD/ CPA_DD_001 A.4.2
Validator request:	The CPA-DD does not contain confirmation 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 is first published for global stakeholder consultation.	
Project participant response:	The text under section A.4.2 of both specific CPA-DD and generic CPA-DD has been adjusted and now include confirmation 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 is first published for global stakeholder consultation.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CAR 14	Reference: CPA-DD-001, B.2.
Validator request:	Verifiable justification why the small-scale specific CPA is eligible to be included in the PoA is missing (please refer also to CAR 3).	
Project participant response:	The text of the specific CPA-DD (CPA-001) has been revised to make it more specific to include only sites that are owned, managed, operated or built by IOT. Furthermore it has been included that only brownfield locations can be included under CPA-001. Also, line diagrams of the first foreseen end-user site have been added in supporting documents TRSD_10 to TRSD_14. Also, for CPA-001 has been added supporting document *TRSD_15 End-user Declaration on no Government policy LED lighting*, which is the signed declaration from the first foreseen end-user	

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	under CPA-001, confirming that the first end-user site where LED lighting equipment is to be installed, as part of LED's save energy, is not covered by an enforced government policy that includes mandatory adoption of LED lighting equipment. Furthermore, a list of IOT sites has been added as supporting document *TRSD_16_IOT_sites.* This is also included in the specific CPA-DD under Section A.4.1.2.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CAR 15	Reference: CPA-DD-001, B.5.3
Validator request:	Estimated emission reduction in 2012 (B.5.3) is not correctly calculated. Table 1 is not consistent to Table 6.	
Project participant response:	CPA-DD-001 has been updated, following the latest calculations taken into account only sites that are owned, managed, operated or built by IOT. This is also presented in supporting document *TRSD_08_CER_Calculations.*	
Validator conclusion:	Not OK. In CPA-001 CER calculation doesn't consider the assignment of the projected IOT sites to the relevant grid as per Annex 3 to the CPA-DD and the procedure defined in CME/02/24. Furthermore, the CER calculation is based on a l_y value (17.28%) which is only appropriate for the state of Maharashtra	
Project participant response:	All identified sites have been assigned to a grid, using procedure CME/02/24 (supportive document FRSD_03_CPA001_PROCEDURE TO DETERMINE THE RELEVANT GRID EMISSION FACTOR FOR LED LIGHTING EQUIPMENT_CME_24). Also the relevant average annual technical grid losses have been identified per site. Based on these the CER calculations have been updated (and subsequently the relevant tables in the specific CPA-DD) (FRSD_02_CER_Calculations and 120330_CPA-DD_specific_LEDs_save_energy_track_changes_v_5). In the PoA-DD it has been clarified why the default value of 10% for the average annual technical grid losses can be used. The LED's save energy PoA is a demand side energy efficient lighting technology. Hence not only generated electricity is displaced, also technical grid losses are avoided (additional generation). The default value of 10% has been used in AMS II-J *Demand-side activities for efficient lighting technologies (*version04*)* and AMS II-L *Demand-side activities for efficient outdoor and street lighting technologies (*version 01). And can therefore be considered appropriate.	
Validator conclusion:	OK, All identified sites have been assigned to the relevant grid CPA-DD-001 and the CER calculation sheet have been accordingly revised, CAR closed.	Date: 30/04/2012

No.:	CAR 16	Reference: CPA-DD-001, B.2; PoA-DD A.4.3
Validator request:	Additionality is provided at PoA level. Individual CPA additionality is addressed by eligibility criteria 7 and 8. It is unclear how compliance to criteria 7 will be proven and in particular how you justify criteria 8 regarding CPA 001. Particularly with regard to the fact that only one project site is known yet.	
Project participant response:	For <u>eligibility criterion #9 on additionality</u>, in Annex 1 of the Template Eligibility Check Report procedure CME/03/16, in the compliance statement required from prospective CPA-owners, an explicit reference has been added to the favorable conditions options specified under point 5 of Annex 2 of CME/03/16, as follows: *"(…) as per the favorable conditions specified by prospective CPA-owner under point 5 of Annex 2 of the latest version of CME procedure CME/03/16>"* For <u>eligibility criterion #10 on enforced government policy</u>, the compliance statement from prospective CPA-owners has been revised to include the requirement of a signed statement (based on the template provided in CME procedure CME/03/26) by the first end-user under each respective CPA confirming that the first end-user site where LED lighting equipment is to be installed, as part of LED's save energy, is not covered by an enforced government policy that	

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	includes mandatory adoption of LED lighting equipment. For CPA-001 has been added supporting document *TRSD_15 End-user Declaration on no Government policy LED lighting*, which is the signed declaration from the first foreseen end-user confirming that the first end-user site where LED lighting equipment is to be installed, as part of LED's save energy, is not covered by an enforced government policy that includes mandatory adoption of LED lighting equipment.
Validator conclusion:	With regard to the inclusion of the first CPA under the PoA PP provided sufficient evidence (incl. CL11) that the CPA-001 will meet eligibility criterion 10. But in order to reflect the on-going policy development in India and to support the plausibility of future end-user declarations the CME shall provide the DOE validating the inclusion of further CPAs under the PoA an official letter on the status of LED relevant national and/or sectoral policies, circumstances and programmes.
Project participant response:	There is currently no mandatory legislation stipulating the introduction or usage of LED lighting technology. This inclusion criterion is to be checked during inclusion of CPA-001, that is now (during validation). The PPs have obtained a letter from IOT (FRSD_04_CPA-001_End_user_Declaration_on_no_Government_policy_LE_CME_26) stating "This is to certify that all IOT Energy & Infrastructure & Energy Services Ltd sites included in Annex I, and where LED lighting equipment is to be installed as part of LED's save energy CPA-001, is not covered by an enforced government policy that includes mandatory adoption of LED lighting equipment.
Validator conclusion:	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. Date: 10/05/2012
Project participant response:	The project participants have addressed this issue by adding under Section A.4.2.2 Eligibility criteria for inclusion of a SSC-CPA in the PoA. The following criterion "Is the market penetration of LED lighting in India below 33% at the time of inclusion of the CPA?" (number 11). This change was also incorporated in the CME operational manual procedure 16 "TEMPLATE CPA ELIGIBILITY CHECK REPORT". This is explained in more detail under section A.4.3 (Additionality) under the Common Practice analysis. Based on: Surry, D. W. and Ely, D. P.: Adoption, Diffusion, Implementation, and Institutionalization of Educational Technology. Available at: http://www.usouthal.edu/coe/bset/surry/papers/adoption/chap.htm The threshold of 33% market penetration is based on Rogers' (1995) 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. See Figure 1 for the distribution of adopter categories within a typical population.

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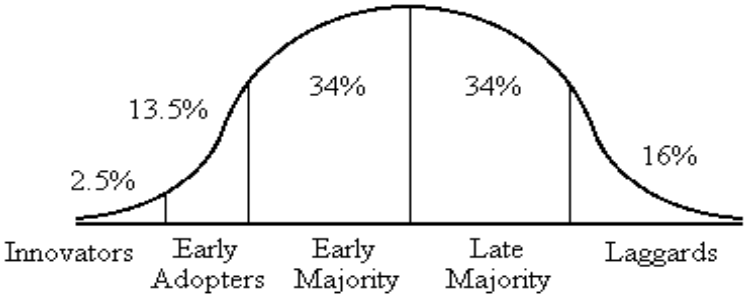
Figure 1: Distribution of adopter categories within a typical population



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

Currently the market penetration is well below 2%. This is estimated by the Electric Lamp & Component Manufacturers' Assocaition of India (ELCOMA). This proof is also used for CPA-001.

Validator conclusion:	OK	Date: 10/06/2012

No.:	CAR 17	Reference:	CPA-DD-001, B.2; PoA-DD A.4.3
Validator request:	Compliance with the PoA eligibility criteria has not been documented in the specific CPA-DD, Further; please provide the results of the assessments or other verifiable documents.		
Project participant response:	The specific CPA-DD has been updated. The assessment report for CPA-001 have been made available: file TRSD_05_CPA-001_Eligibility_Check_Report		
Validator conclusion:	OK	Date: 05/03/2012	

No.:	CAR 18	Reference:	CPA-DDs, B.6.1; PoA-DD E.7
Validator request:	Applicability of the selected methodology to the proposed programme activity is not OK.		
Project participant response:	The CAR relates to the following requirement of AMS-II.C, at brownfield sites: "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 project participants have addressed this issue under a) A.4.4.2. Monitoring plan and under b) the CME operational manual CME/03/12: Procedure for scrapping of replaced equipment. Under step 1 (responsibility of CPA owner) is added: 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 project participants would also like to highlight that an independent local environmental auditing company will audit the scrapped lamps by comparing the number of caps (or other pieces) with the amount of installed brownfield lamps in the CME project database.		
Validator conclusion:	Not OK: The sampling procedure of "number" and "power" acc. para. 12 AMS.II-C has not been added to the monitoring plan of generic CPA-DD version 5.0 and specific CPA-DD version 5.0. 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) Date: 10.05.2012		

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Project participant response:	Under Section E.7.1.Data and parameters to be monitored by each CPA. The parameters 'number' (ni) and 'power' (pi) have been updated to include this procedure. This change was also incorporated in the CME operational manual procedure 12 "PROCEDURE FOR SCRAPPING OF REPLACED EQUIPMENT". "As per paragraph 12 of AMS II.C. Demand-side energy efficiency activities for specific technologies (v13) a representative sample of the replaced devices (including the number and "power") will be recorded to allow for physical verifcation 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 verifcation." The CPA-DD's have been updated accordingly.	
Validator conclusion:	OK	Date: 10/06/2012

No.:	CAR 19	Reference: Additionality Tool
Validator request:	Within SSC projects the barrier analysis approach can be carried out by different ways including the techniques that resemble the elements of the Additionality 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 Additionality 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 Additionality Tool the PoA DD wording is misleading in its references to the Additionality Tool.	
Project participant response:	Under Section A.4.3 it has been updated to correctly reflect the used tools: "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. 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 'Tool for the demonstration and assessment of additionality are used. Note, 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 (version17) 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 save Energy 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" Furthermore the demonstration of a technological barrier & institutional, managerial resources and capacity to absorb new technologies barriers have been updated. To better reflect the used tools & guidelines.	
Validator conclusion:	OK	Date: 10/06/2012

No.:	CAR 20	Reference: POA-DD
Validator request:	Clear statement about the scope in the POA-DD is missing	
Project participant response:	The PP have included in the PoA-DD; Section E.1 that the programme classifies as: Scope 3: Energy Demand / TA 3.1 Energy Demand	

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Validator conclusion:	OK	Date: 17/10/2012

No.:	CAR 21	Reference:	CPA-DD-001
Validator request:	the 1st CPA crediting period shall be indicated in the CPA DD and it must not be earlier than date of inclusion in the registered PoA (or any date later).The duration of the crediting period shall not exceed the end date of the PoA.		
Project participant response:	The PP have updated the starting date in the PoA-DD Section B.1 to 01/09/2012. The start of the frist crediting period of the first CPA (CPA-001) is expected to coincide with the date of regisrtration of the PoA. The PP have updated in the CPA-DD under Section A.4.3.1 as: starting date of the crediting period is set as the later of 01/09/2012, or the date of including the CPA-001 under the registered PoA. Following this change the ER calculations for CPA-001 have been updated.		
Validator conclusion:	OK	Date:	17/10/2012

No.:	CL 1	Reference:	A.4.4.2. Monitoring plan, E.6.2. Equations, incl. fixed parameters
Validator request (round 2 – CL1):	The “outage factor” of the old lamps is likely higher than the one monitored for the LEDs (longer lifetime, higher reliability, better warranty due to higher investment costs). How do you ensure that the baseline is conservative (and emission reductions are not overestimated for conventional lamps which would not have been replaced in the baseline scenario)?		
Project participant response:	The installation of LED equipment is still more costly compared to baseline lighting equipment. After barriers have been overcome, the end-user makes a well informed decision to invest in LED lighting equipment. The main reason for this investment is that he is in need for the service lighting. For example for production (warehouses) or safety purposes (road lighting). For brownfield projects, only existing lighting devices can be replaced. The installed existing lighting equipment can be considered as the minimum lighting service level. While actual lighting demand in most cases supersedes this level. It can be argued that there is a case of suppressed demand. Hence the approach as described in the DD’s will not lead to an overestimation of emission reductions. Furthermore the project participants found that the outage factor was not properly applied to the baseline emission calculations. This has been corrected.		
Validator conclusion:	Explanation OK, but please refer to CL 3.	Date:	23/01/2012

No.:	CL 2	Reference:	B. Duration of PoA
Validator request (round 2 – CL2):	There is an inconsistency in the date of the first LED lighting equipment installed. Please clarify and unambiguously specify all starting dates.		
Project participant response:	The starting date of the PoA coincides with the staring date of the first purchase of LED lighting equipment under the programme. In the submitted documentation was described as 01/01/12. Due to delays the Project Participants have decided to change these dates to 01/03/12.		
Validator conclusion:	OK.	Date:	23/01/2012
Project participant response:	Due to further delays the Project Participants have updated the PoA start date to 01/12/2012		
Validator conclusion:	OK.	Date:	17/10/2012

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No.:	CL 3	Reference:	E.6.3. Data and parameters to be reported in the CPA-DD Form
Validator request:	The site visit revealed that more than 10% of lamps were broken. How do you ensure that the option to choose between sample and fixed value is conservative enough and which procedure covers the appropriate rule?		
Project participant response:	The Project Participants have decided to remove the option to use 'documented maintenance practices'. It is now only possible to use the default outage factor of 1 month (8.3%).		
Validator request:	Source of the "*default outage factor of 1 month (8.3%)*" is unclear. Further, please explain why the default factor is deemed conservative.		
Project participant response:	A signed statement from the end-user has been added as supporting document *TRSD_07_Outage_factor.*		
Validator conclusion:	Not OK. Observations by the validation team on-site revealed that more than 10% of lamps were broken. Therefore the IOT statement is not plausible. Furthermore, PP failed to explain why the proposed outage factor is conservative. Date: 06.03.2012		
Project participant response:	The Project Participants point out that IOT has a maintance scheme in place that assures timely replacement of broken lights. Lighting is a security requirement, hence there is a clear incentive to replace the broken lights. In order to ensure a conservative estimation of CERs the Project Participants will not use the indicated period by IOT for CPA-001, but use the default value. This default outage factor has been increased from one to three months. This implies that if there is an LED failure the LED is replaced within three months.		
Validator conclusion:	OK, the estimation is deemed conservative.	Date: 09/05/2012	

No.:	CL 4	Reference:	E.6.3. Data and parameters to be reported in the CPA-DD Form
Validator request:	The operational manual does not specify the process clear enough how the appropriate grid (NEWNE or South) is determined and how it is ensured that only facilities in the same grid are gathered within a specific CPA.		
Project participant response:	POWERGRID is the Central Transmission Utility. At the State level, there are Gencos and Transco in the respective States. India has been demarcated into five electrical Regions viz. Northern (NR), Eastern (ER), Western (WR), Southern (SR) and North Eastern (NER). However, NR, ER, WR and NER have been synchronously interconnected and operating as single grid – Central Grid (capacity about 110,000MW). The Southern region is asynchronously connected to the Central Grid through HVDC links. Consequently there are two grid emission factors for all of India 1) the NEWE grid and 2) the South grid published by the Central Electricity Authority. In order to determine which emission factor is to be used the grid can be checked at the website of the POWERGRID company (www.powergridindia.com) The delineation of the south grid can be found under: http://www.powergridindia.com/PGCIL_NEW/Files/Events/SR.pdf and is added as SRSD_02_Delineation_South_Grid. If the LED lighting equipment that is replaced is located in the delineated area the emission factor for the South grid is to be used, else the NEWE emission factor can be used. In the CME manual a procedure to determine the relevant grid emission factor for LED lighting equipment (CME/02/24) has been included.		
Validator conclusion:	Delineation is OK	Date:	05/03/2012

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No.:	CL 5	Reference:	CPA: A.4.4. Estimated amount of emission reductions
Validator request:	There is an inconsistency in the number of end-users in CPA-001.		
Project participant response:	All the values in the specific CPA-DD, have been updated according to the updated CER calculations SRSD_04_LEDs_Save_Energy_updated_CER_estimation_calculation.		
Validator conclusion:	OK, but please refer to CAR#15.	Date:	12/01/2012

No.:	CL 6	Reference:	E.6.3. Data and parameters to be reported in the CPA-DD Form
Validator request:	Please submit evidence of BEE regarding the relative high value of 30% for average annual technical grid losses used. Furthermore the operational manual does not adequately address the technical loss issue at the CPA level.		
Project participant response:	The transmission and distribution losses (T&DL) are to be determined for each LED lighting equipment. There are no PAN India figures for T&DL. In general figures on a state level are available. The procedure to determine the applicable T&DL for each LED lighting equipment a procedure has been included in the CME manual (CME/02/25) Furthermore the parameter 2 ly has been moved to section B.6.1 to allow for monitoring during the crediting period. The first end-user under CPA-001 is located in the state of Maharashtra. For this state the technical transmission and distribution losses for 2011 are determined as 17.28% http://www.caclubindia.com/reader/power-distribution-utility-mahavitaran-reports-distribution-losses-3094.asp#.TwHCQ5hkWFZ This is included in the supportive documentation as SRSD_03_TDL_ Mahavitaran_Transmission_and_Distribution_losses published by the Power Distribution utility Mahavitaran Ltd.		
Validator conclusion:	Not OK. CPA-DD-001, which has been updated due to CAR/CL round 1, lists sites in other states than Maharashtra. Using Mahavitaran T&D losses of 17.28% for all sites is not appropriate for the purpose of the CPA-001 ER estimation (see CAR#15). PP is requested to apply the procedure as defined in CME/02/25 and to submit the corresponding official documents/ publications regarding state level T&D losses. Date: 12.03.2012		
Project participant response:	The Project Participants have applied operational procedure CME/02/25 FRSD_05_PROCEDURE TO DETERMINE THE TRANSMISSION AND DISTRIBUTION LOSSES FOR LED LIGHTING EQUIPMENT_CME_25). All sites have been assigned to the relevant distribution company (DISCOM). If possible technical grid losses have been identified based on the most recent available published values. References to the websites where the figures have been published are included. If it was not possible to establish the technical losses the default value of 10% has been used. The CER calculations (and subsequently the specific CPA-DD) have been updated to reflect these changes.		
Validator conclusion:	OK CPA-DD-001 and the CER calculation sheet have been accordingly revised, CL closed.	Date:	30/04/2012

No.:	CL 7	Reference:	E.6.3. Data and parameters to be reported in the CPA-DD Form
Validator request:	How do you ensure comparable service levels (lux/m2) for each individual stratum of a CPA given that ID 5/pi and ID 6/pk only refers to each CPA? See also CAR1, CAR5, CL1, CAR7 and CAR8		

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Project participant response:	The comparability of service levels and the compliance with the National Lighting Code has been explained under CAR 1, CAR 4		
Validator conclusion:	OK	Date:	23/01/2012

No.:	CL 8	Reference:	CPA: B.6.1. Monitoring plan description, Annex 4
Validator request:	There is insufficient detail in the CME monitoring procedures. Furthermore, a graphical chart with details has been requested (see CAR4)		
Project participant response:	A graphical chart has been included in the CME operational manual under procedure for monitoring of the CPAs (CME/02/11) page 27 (figure 1, schematic representation of monitoring process). The procedures for quality assurance and quality control have been included under the answer to CL7.		
Validator conclusion:	OK	Date:	23/01/2012

No.:	CL 9	Reference:	CPA: B.6.1. Monitoring plan description
Validator request:	Please elaborate on and provide a line diagram of the number of lamps to be replaced in the first specific CPA.		
Project participant response:	During the OSV the location of the lamps could be checked. The project participants do not have such a diagram available.		
Validator conclusion:	Line diagrams of the first CPA-001 site have been submitted (TRSD_10-14) on February 23, 2012. PP shall explain why the information provided was not reflected in CL 9. Date: 06.03.2012		
Project participant response:	The PPs incurred delays in the obtainment of the line diagrams. This was firstly due to an internal miscommunication on this topic within the project team, and secondly due to a software difficulty. The diagrams where in a CAD-format, and it took some time for the end-user to convert the documents into pdf, a format that could be shared with the DOE.		
Validator conclusion:	Cross-checked with info from first site visit. The argumentation is plausible. CL closed	Date:	30/04/2012

No.:	CL 10	Reference:	CPA: A.4.1.2. Geographic reference
Validator request:	The CME operational procedures include a template for the waiver of CERs (CME/01/18). The reference number is wrong. Evidence for the waiver of CERs for CPA-001 cannot be found.		
Project participant response:	The correct reference number for the waiver is CME/01/17. The project participants are currently awaiting the signing of the contract for participation under the PoA. The end-user will not sign a waiver before the final contract is signed. We suggest making this CL a FAR.		
Validator request:	CER waiver template (CME/01/17) can still not be found in the CME operational manual version 2.0. CL 10 cannot be addressed by a FAR. Due to PoA eligibility criteria N°3 evidence for the signed waiver is a requirement to include CPA-001. Please refer also to CAR#3 and CAR#17 (CPA compliance with the PoA eligibility criteria).		
Project participant response:	The signed CER waiver from the first foreseen end-user under of CPA-001 has been added as supporting document *TRSD_04_Waiver_CERs_signed.*		
Validator conclusion:	OK	Date: 05/03/2012	

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No.:	CL 11	Reference: A.4.3. sub-step 1b
Validator request:	Relevant national and/or sectoral policies and circumstances are considered but not listed in the PoA DD (p. 11):	
Project participant response:	PP has indicated that no mandatory policies exist. PP cannot prove something that does not exist. PP also refers to section A.4.3. of the registered PoA "CFL lighting scheme –Bachat Lamp Yojana" by the Bureau of Energy Efficiency of the Government of India.	
Validator conclusion	OK, has been checked	
TR request	Sectoral policies/ circumstances are missing in PoA-DD.	
Project participant response:	The PP have explained in the PoA-DD Section A.4.3 (sub-step 1b) that: The most relevant authority for regulations considering energy savings is the Bureau of Energy Efficiency (BEE). This as set up under the Energy Conservation Act, 2001 to promote energy efficiency. There are various mandatory and voluntary provisions of the Act that have been implemented by BEE in the form of projects and schemes. Such as the Announcement of National Mission on Enhanced Energy Efficiency (NMEEE) in 2009. However there is currently no mandatory legislation stipulating the introduction or usage of LED lighting technology.	
Validator conclusion:	OK	Date: 17/10/2012

No.:	CL 12	Reference: A.4.3.
Validator request:	The technological barrier is not sufficiently supported by evidence, in particular given recent developments for LED road lightning programs initiated in India.	
Project participant response:	While PP consider CL12 to be a statement, not a request, PP interprets CL12 to be a request for further supporting documentation of the technological barrier. PP would like to refer the DOE to the "Strategies Unlimited report LED Luminaires, Market Analysis and Forecast (2nd edition, February 2011), that was made available to the DOE as SD_18 LEDs Save Energy LED Luminaires report-1_p1_p94 as well as all the other referenced existing supporting documents of PoA-DD section A.4.3, including amongst others SD_07 (McKinsey article on road blocks). PP have now made available to the DOE additional supporting documentation, TRSD_03_LED_Luminaires_report_2_p95_p187 and PP request DOE to refer especially to chapter 8 "Outdoor Area Lighting", in particular to Section 8.3.7 entitled "Challenges" on page 186, where it is written that: "There are many designs of LED area lights and streetlights on the market. Pilot projects have been undertaken to analyze the light quality, brightness, uniformity of light output, color shifting, glare, performance of the drivers, and maintenance needs. Some pilot projects will be used for longitudinal studies to analyze the life of LED streetlights. The technology is improving so fast that longitudinal studies may not be representative, but in the absence of longitudinal tests it will be difficult for municipalities to commit scarce capital outlays to purchase replacement streetlights on a large scale. Some persistent challenges with LED luminaires in this market are: • Only a few outdoor area LED lamps meet the streetlight specifications • Quality issues and glare factor continue to nag the industry • Maintenance needs of the fixture operating a streetlight over a long period are not fully understood • Life of the components, such as the drivers, and end-of-life strategies has not been resolved." PP would like to note that Strategies Unlimited is widely regarded as the top authoritative source of information on LED lighting. PP believes that all supporting documents that have now been made available to the DOE	

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	constitute sufficient supporting evidence.	
Validator conclusion:	OK, but please refer to CAR#16	Date: 05/03/2012

No.:	CL 13	Reference: CPA A.4.1.2.
Validator request:	It shall be further detailed how various CPAs can be distinguished from each other.	
Project participant response:	The PPs kindly refer to procure CME/01/06: procedure for issue of unique ID for CPA's and updating of CPA list. The PP have included in CPA-001 under Section A.4.1.2 that the geographical coordinates of CPA-001 are 18.90961N, 73.02059 S. This is the location where the first lights are installed (Navghar Terminal)	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CL 14	Reference: A.4.1.2.
Validator request:	"*Anywhere in the document where it is stated "India" as a reference to the geographic boundary of the PoA it could also mean "other countries added post registration*" The statement is unclear, since the PoA DD submitted for validation cannot meet EB60 Annex 26/ II. 6 a, b, c in advance.	
Project participant response:	The statement has been deleted from the DD's.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CL 15	Reference: CPA_DD_001 A.4.1.2.
Validator request:	It is unclear why the CPA-DD_001 does not provide information on the unique identification of the first project site.	
Project participant response:	PP kindly refers DOE to PP's responses to CAR3 and CAR14 above.	
Validator conclusion:	OK	Date: 05/03/2012

No.:	CL 16	Reference: CPA_DD_001, A.4.7.
Validator request:	It is unclear how the CPA-001 owner can confirm that the proposed CPA is not part of another registered PoA. Please submit the assessment results.	
Project participant response:	PP have amended CME operational manual procedure CME/02/16 by including the CME's debundling check assessment as follows: <u>To be filled by CME: debundling check:</u> The CME has checked the CDM website[2] on [insert date] and the most recent CDM project pipeline overview published by the UNEP Risoe Centre[3], dated [insert date of publication of CDM project pipeline overview]. Based on the two aforementioned sources (CDM website and UNEP Risoe pipeline overview), the CME concludes that: ☐ the CPA is registered as an individual CDM project activity with CDM reference ID number [insert ID number] ☐ the CPA is included in registered CDM PoA, with CDM reference ID number [insert ID number] ☐ the CPA is neither registered as an individual CDM project activity nor included in another registered CDM PoA For CPA-001 the above documentation is made available to the DOE.	

[2] http://cdm.unfccc.int
[3] http://cd4cdm.org

MoV = Means of Validation, DR = Document Review, I = Interview, N/A = Not Applicable
CAR = Corrective Action Request, CL = Clarification Request, FAR = Forward Action Request

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Validator conclusion:	OK	Date: 05.03.2012

No.:	CL 17	Reference: PoA-DD Table A.3
Validator request:	Table A.3 of the PoA DD (page 5) does not contain any indication of the CME.	
Project participant response:	In Table A.3 of the PoA-DD it has been indicated that Mabanaft Carbon India Pvt. Ltd is the CME. Note this was already reflected in the section below Table A.3	
Validator conclusion:	OK	Date: 30/05/2012

No.:	CL 18	Reference: PoA-DD
Validator request:	It is unclear how the CME shall have control over each CPA. The Monitoring/ Scrapping/ Financing role in this regard is not clear. Especially as this entity is "not to disclose". What happens if this entity will claim that the monitoring is OK? Who has control? Please describe the situation clearly.	
Project participant response:	The PP would like to point out that the 'LED's save energy' programme involves a range of operational activities in order to effectively implement and manage both the overall PoA as well as each individual CPA. The overall management responsibilities reside with Mabanaft Carbon India, the CME. The operational structure of the programme is described in the PoA-DD section A.4.4.1. Operational and management plan. In figure 5 an overview of the different parties involved in the programme is depicted and their respective responsibilities is given in Table 4. Considering the monitoring party, a competent partner has been identified and discussions for contracting are underway (see also supporting document: SD_27_LEDs_Save_Energy_Draft_MoU_SA_MCI_Joshi_17062011) . However definite contracting is dependent on succesful registration of the project. The CME will remain involved in the monitoring process, to ensure quality and competitibility of the monitoring results with the rules of the PoA-DD.	
Validator conclusion:	OK	Date: 17/10/2012

No.:	CL 19	Reference: PoA-DD E.4 and A.4.3
Validator Request	The Project Participants revised in PoA-DD version 5.1 Section A.4.3. The identified alternatives to the programme of activity are: 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. Project implementation as described in the PoA-DD but not undertaken as a CDM project activity. Scenario 3 Programme achieving the same results 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. 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: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions; - Other Barriers (institutional, managerial resources and capacity to absorb new technologies) It is unclear why baseline scenarios and the barrier analysis have been revised. Further, there is an inconsistency between Greenfield baseline scenarios E.4 and scenarios discussed in the	

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	identification of baseline alternatives A.4.3
Project participant response:	The PP have decided to update the alternatives defined for the project activity. However this was only changed under Section A.4.3 and not under Section E.4. The main reason for the change is that scenario 3 contained the phrase " Programme achieving the same results with different technology". The PP juged this not a realistic scenario, as such a solution is technologically not avialable. Hence this was removed. In ths GSC scenario's there was twice mentioned: "of a different incentive mechanism". The PP have decided to make the scenario's more clear by defining scenario 2 as "Same programme without use of the CDM" and scenario 3 as " Programme achieving the same results with a different incentive mechanism". In the tables below the scenarios as included in the PoA-DD for GSC and the scenarios as included in the current version of the PoA-DD are presented. GSC scenario's:

No	Name of scenario	Description of scenario
1	Business as usual	The introduction of energy saving lighting technology and corresponding electricity savings are left to the market without further incentives.
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 retrofits without the use of the Clean Development Mechanism, 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	Realise electricity savings through the introduction of innovative energy saving lighting technology other than LED without the use of the Clean Development Mechanism, with use of a different incentive mechanism.

Current scenario's:

No	Name of scenario	Description of scenario
1	Business as usual	The introduction of energy saving lighting technology and corresponding electricity savings are left to the market without further incentives.
2	Same programme without use of the CDM	Project implementation as described in this PoA but not undertaken as a CDM project activity.
3	Programme achieving the same results with a different incentive mechanism	Project implementation of LED lighting equipment through the support of a different mechanism, for instance a government subsidy policy.

Section A.4.3 and Section E.4 of the PoA-DD have been made consistent by replacing the "GSC" scenario's still included under section E.4 with the scenarios stated under A.4.3.

The project particpants have updated the section on the demonstration of additionality (A.4.3).
Up to version 5.0 of the PoA-DD the *Tool for the demonstration and assessment of additionality'* (Version 5.2). However changes in this tool (v 6.0) had consequences for the demonstration of additionality for LED's save energy PoA. In the new version a detailed definition of what a prevailing practice barrier is has been included. The result is that prevailing practice is now 1 on 1 related to the introduction of new technology. For FoIK the following definition has been developed: "The project is the first in the applicable geographical area that applies a technology that is different from any other technologies able to deliver the same output and that have started commercial operation in the applicable geographical area before the start date of the project". Where 'different technologies' have been defined in the context of FoIK as (para 7) "technologies that deliver the same output and differ

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	by at least one of the following (..) a) Energy source/fuel b) Feed Stock c) size of installation (power capacity) (i)Micro, ii) Small, iii) Large. The result of this change was that according to the new version of the tool LED and incandescent/fluorescent lamps can not be considered a different technology, as not one of the options (Energy, Feed Stock, Size) differs (para7). Hence LED can not be considered FoIK. This implies that the demonstration of additionality, based on the prevailing practice barrier (as per our PoA), is not correctly applied. The PP used the *Tool for the demonstration and assessment of additionality* as best practice, however its usage is not obligatory as per methodology AMS II.C version 13. Hence the PP decided to demonstrate additionality of the PoA based on the criteria outlined in Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities. This issue was also included in a request for clarifcation to the Small Scale Working Group: SSC-WG (SSC_630) https://cdm.unfccc.int/filestorage/0/u/T7BR2PO8YDSI0MQKUV63JCXGLW4EH9.pdf/Final%20response.pdf?t=VEp8bTc2MWR2fDCPris8kc_TXh-I1XCHAGTL The prevailing practice barrier, the SSC WG clarified (SSC_630) that if Attachment A to appendix B is used to demonstrate additionality of the SSC project, then it is not mandatory to use the "Tool for the demonstration and assessment of additionality" and thus the "Guidelines on additionality on first of its kind project activities (FOIK, EB 63 Annex 11) are also not mandatory. The PP feel that by restructuring PoA-DD section A.4.3 a better understanding why the project is prevented from occuring without the CDM is provided.	
Validator conclusion:	OK. It is SQS' opinion that the changes are transparently described and are a result of new versions of tools and guidelines.	Date: 17/10/2012

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