



VALIDATION REPORT

UGL SERVICES PREMAS OPERATIONS LIMITED

VALIDATION OF THE DEMAND SIDE ENERGY EFFICIENCY MEASURES IN BUILDING LIGHTING SYSTEMS

REPORT NO. SINGAPORE-VAL/006/2010
REVISION NO. 3

BUREAU VERITAS CERTIFICATION

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VALIDATION REPORT

Date of first issue: 11/01/2013	Organizational unit: Bureau Veritas Certification Holding SAS
Client: UGL Services Premas Operations Limited	Client ref.: Mr. Panchaksharam Thirumalavan
<p>Summary:</p> <p>Bureau Veritas Certification has made the validation of the Demand side energy efficiency measures in building lighting systems located in Singapore on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.</p> <p>The validation scope is defined as an independent and objective review of the PoA-DD, the baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the PoA design and the baseline and monitoring plan; ii) follow-up interviews with stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.</p> <p>The first output of the validation process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Appendix A. Taking into account this output, the Coordinating/Managing Entity revised its PoA design documents.</p> <p>In summary, it is Bureau Veritas Certification's opinion that the PoA correctly applies the baseline and monitoring methodology AMS II.C, Version 14 and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.</p>	

Report No.: Singapore-val/006/2010	Subject Group: CDM
Project title: Demand Side energy efficiency measures in building lighting systems	
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1 INTRODUCTION

UGL Services Premas Operations Limited has commissioned Bureau Veritas Certification to validate its CDM project "Demand Side energy efficiency measures in building lighting systems" (hereafter called "the PoA") in Singapore.

This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 Objective

The validation serves as programme design verification and is a requirement of all programme project activities. The validation is an independent third party assessment of the programme design. In particular, the PoA's baseline, the monitoring plan (MP), and the programme compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the programme design, as documented, is sound and reasonable, and meet the stated requirements and identified criteria. Validation is a requirement for all CDM programme and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

1.2 Scope

The validation scope is defined as an independent and objective review of the programme design documents, the baseline study and monitoring plan and other relevant documents at POA level. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The validation is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the programme design.

1.3 Validation team

The validation team consists of the following personnel:

FUNCTION	NAME	TA 3.1	TA X.X	TASK PERFORMED*
Team Leader	Ram M. Desai	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input checked="" type="checkbox"/> RI
Team Member	So Shuk Ling	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI
Technical Specialist	Murugappan Palanisamy	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI
Financial Specialist	N.A.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI
Internal Technical Reviewer (ITR)	H.B. Muralidhar	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input checked="" type="checkbox"/> RI
Specialist supporting ITR	N.A.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI



*DR = Document Review; SV = Site Visit; RI = Report issuance

2 METHODOLOGY

The overall validation, from Contract Review to Validation Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a validation protocol was customized for the programme, according to the Clean Development Mechanism Validation and Verification Standard (version 5), Clean Development Mechanism Project Standard (version 5), issued by the Executive Board at its 75th meeting on 04/10/2013. 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 completed validation protocol is enclosed in Appendix A to this report.

2.1 Review of Documents

The PoA-DD submitted by UGL Services Premas Operations Limited and additional background documents related to the project design and baseline, i.e. country Law, PoA-DD form, Approved methodology, Kyoto Protocol, Clarifications on Validation Requirements to be Checked by a Designated Operational Entity were reviewed.

To address Bureau Veritas Certification corrective action and clarification requests, UGL Services Premas operations Limited revised the PoA-DD and resubmitted it on 20/12/2012.

The validation conclusions presented in this report relate to the project as described in the PoA-DD version 02 Dated 20/12/2012.

2.2 Follow-up Interviews

On 6/12/2012, 07/12/2012 and 08/12/2012 Bureau Veritas Certification performed interviews with stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of UGL Services Premas Operations Limited were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
UGL Services Premas Operations Limited.	<ul style="list-style-type: none"> ➤ Project Background, PoA and CPA consideration ➤ Agreement sign with Individual Town councils for CPA inclusion ➤ Environmental legal law and Environmental analysis for CPA ➤ Scrap Luminaries / equipment monitoring ➤ Sources and gases included in the CPA boundary ➤ Additionality demonstration ➤ Environmental legal law and environmental analysis ➤ Site visit ➤ Project background and PoA consideration ➤ CPAs inclusion in PoA ➤ Meeting with DNA Singapore (NEA) on letter of approval ➤ Environmental legal law and environmental analysis ➤ Stake holder consultation processes ➤ Additionality demonstration
LOCAL Stakeholder + Residents in the HDB Blocks	<ul style="list-style-type: none"> ➤ Feedback of the information of survey participant done during the stakeholders consultation Meeting on 03 Feb 2010
EM Services	<ul style="list-style-type: none"> ➤ Project Background ➤ Contract for providing technology and replacing existing light luminaries with LED Luminaries in identified HDB blocks of Zone 2 with individual town council. ➤ Replacement Schedule and completion status. ➤ Scrap Disposal and relevant statutory compliance.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation is to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the programme design.

Corrective Action Requests (CAR) is issued, where:

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

The validation team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

The validation team may also raise a forward action request (FAR) during validation to identify issues related to programme implementation that require review during the first verification of the CPA under the PoA.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.



2.4 Internal Technical Review

The validation report underwent an Internal Technical Review (ITR) before requesting registration of the programme.

The ITR is an independent process performed to examine thoroughly that the process of validation has been carried out in conformance with the requirements of the validation scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the validation report to the reviewer, including any necessary validation documentation. The reviewer reviews the submitted documentation for conformance with the validation scheme. This will be a comprehensive review of all documentation generated during the validation process.

When performing an Internal Technical Review, the reviewer ensures that:

The validation activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.

The review encompasses all aspects related to the project which includes PoA design, baseline, additionality, monitoring plan and emission reduction calculations, internal quality assurance systems of the CME as well as the PoA, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the validation exercise, review of sample documents.

The reviewer compiles clarification questions for the Team Leader and Validation Team and discusses these matters with Team Leader.

After the agreement of the responses on the 'Clarification Request' from the Team Leader as well as the CME(s) the finalized validation report is accepted for further processing such as uploading on the UNFCCC webpage.

3 VALIDATION CONCLUSIONS

In the following sections, the conclusions of the validation are stated.

The findings from the desk review of the original programme design documents and the findings from interviews during the follow up visit are described in the Validation Protocol in Appendix A.

The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in 11 Corrective Action Requests (CARs) and 04 Clarification Requests (CLs).

The CARs and CLs were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section correspond to the VVS paragraph

3.1 Approval (43-44)

A letter of approval has been received by the CME from Host party DNA i.e. National Environmental Agency of Singapore/Ref 3 & 4/ and the following support documentation:

- Letter of Approval from host country (Singapore) Dtd. 22/11/2010 /Ref 3/

Bureau Veritas Certification received this letter from the CME and does not doubt its authenticity. The authenticity of the letter of approval was confirmed by discussing with DNA officials over telephone and hence Validation team confirms that the letter issued by the DNA is authentic.



The title and contents of the letter of approval refer to the precise proposed CDM programme activity title in the PoA DD **/Ref-2/** being submitted for registration. However the entity mentioned in the PoA DD Section A.4 is UGL Services Premas Operations Limited, and the DNA Approval provided by CME is for United Premas Ltd., Singapore. To address this discrepancy Validation Team raised CAR-11. CME submitted a formal letter **/Ref-4/** from DNA confirming the change in the Name, hence CAR -11 is closed.

The letter of approval does not refer to a specific version of the validation report and it is observed that the letter of approval is unconditional. there is no specific condition provided by DNA to be complied while implementing the said project activity.

3.2 Authorization (49)

The participation for Singapore as project participant has been approved by a Party of the Kyoto Protocol and the CME obtained letter of authorization of its coordination of the PoA from Singapore DNA, as this PoA will be only implemented in Singapore, there is no other party involved in this PoA implementation.

The validation team concluded this by verifying the Geographical and physical boundary of the PoA, which is restricted to Singapore only. This information is transparently provided in the PoA-DD Section A.5.

3.3 Contribution to sustainable development (52)

The host Party's DNA confirmed the contribution of the project to the sustainable development of the host Party in a letter of approval. Host Party has primarily established three sustainable development criteria, and CME has explained in Section A.2 of PoA-DD, how implementation of proposed PoA will contribute to sustainable development in following three main areas

- **Environmental Sustainability**
 - *PoA implementation would result in achieving Energy conservation and help to establish best practice in Singapore.*
 - *PoA implementation will contribute towards resource efficiency in energy sources which is one of the four strategies identified by the Inter-Ministerial Committee on Sustainable Development, Government of Singapore to ensure Singapore's continued sustainable development.*
 - *PoA will serve as long - term initiative with a potential to add CPAs across several years in future, thus, contributing to Singapore's long term goals (goals up to 2020 and 2030) for improving energy efficiency and reducing carbon intensity.*
- **Economic Sustainability**
 - *The PoA will result in promoting Singapore as a regional hub for energy efficient lighting technologies. There is not a single registered CDM project in the region (South East Asia Pacific region) which implements energy efficient lighting systems in place of existing lighting systems. Therefore, this PoA could serve as precedence for similar projects initiatives in the region. The PoA will also pave the ground for more companies to foray in the efficient lighting technology sector.*
 - *The energy efficient luminaires would result in lower electricity consumption as compared to the baseline and therefore resulting in lower utility bills.*
 - *Inflow of more service providers could result in market competition and lower cost for similar projects.*



- **Social Sustainability**

- *PoA implementation will help in creating more job opportunity and improvement of skills.*

3.4 Modalities of Communications (58, 61)

The validation team has performed due diligence on the MoC statement in accordance with the requirements established in the VVS and confirms that the MoC statement complies with all relevant forms and requirements.

3.5 Project design document (63)

The validation team hereby confirms that the PoA-DD complies with the latest PoA-DD form "**PROGRAMME DESIGN DOCUMENT FORM FOR SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD), Version 02.0**"[1], which is found in accordance with EB Guidelines for completing the programme design document form for small-scale CDM programmes of activities, EB 67 Annex 30 Version 02.0

3.6 Changes in the Programme of Activity (17)

During the site visit there was no changes were observed in project as compared to details mentioned in webhosted PoA –DD.

The final PoA -DD Version 02 has following changes as compared to PoA -DD Version 01 that was webhosted.

1. PoA DD and CPA DD Section A.1 is now revised with detailed technical Specification to address CL01
2. Technical lifetime of LED Luminaries is now corrected to 50000 hours from 500000 Hours.
3. Technology Measures are corrected to reflect correct representation of the PoA intention. PoA section B.2 is not corrected to address CAR03.
4. Sampling Requirements are now included in the PoA DD Section B.3
5. PoA DD Section B.2 Eligibility Criteria is now revised to make it in accordance with EB 54 Annex 13, to address CAR 08
6. PoA DD Section B.2 is now revised in accordance with EB 65 Annex 3 to Address CAR09
7. Roles and responsibilities of personnel involved in the process of CPA inclusion is now included in the PoA DD section B.7.2

3.7 PoA description (69)

The PoA aims to promote energy efficient lighting systems in buildings (including residential, commercial and industrial) across Singapore to achieve electrical efficiency by replacing Compact Fluorescent lamps (of various types i.e.T5, T8, Decorative lights like PL, PLC, 2D) with LED luminaries. The CDM Programme Activities (CPAs) under this PoA will either include

- (a) installation and operation of more energy efficient lighting luminaires replacing existing luminaires in existing buildings; or
- (b) installation and operation of more energy efficient lighting luminaires in new buildings.



The POA aims to implement energy efficient lighting technologies such as Light Emitting Diodes (LEDs) and any other future energy efficient lighting options which are also eligible to be included under the POA.

The luminaires, its associated electronic control gears (driver) and all accessories which will be installed with respect to each CPA, will be designed for reliable operations to light up the locations where they are installed. The luminaires will be able to fully withstand the current and voltage surges of lightning strikes and the frequent switching operation of the power supplies. The power requirement of the project luminaire system will be less than that of the replaced luminaires (in case of existing buildings).

Compared to conventional lighting equipment, LED lightings equipments are:

- Energy efficient compared to existing luminaries therefore less electricity consumption
- Very small (2mm to 8mm) therefore easily occupied onto printed circuit board
- almost instantaneous , very responsive and no flickering
- are very easily dimmed, can be installed with motion sensor controller to obtain more savings
- radiates very little heat in the form of Infrared (IR), easy to handle during maintenance.
- relatively longer useful life up to 50,000 hours (~ more than 10 years based on 12 hours operation per day)
- being solid state components, are not easily damaged by external shock, unlike fluorescent and incandescent bulbs which are fragile.
- Has no hazardous materials

The PoA and Each CPA (to be included under this PoA) will be implemented in a geographically distinct location within Singapore. The length of the PoA is considered as 28 years.

The CME will facilitate the development of CDM Programme Activities (CPAs) which involves either installation and operation of more energy efficient lighting luminaries replacing luminaries in existing buildings or installation and operation of more energy efficient new buildings and their inclusion into the PoA. The CME will also act as the focal point with the CDM Executive Board in all the aspects relating to the validation, verification, registration and issuance of carbon credits generated by the CPAs within the PoA. With regard to the PoA, there is no difference in the national or sectoral policies within the boundary of Singapore. The CPAs under the PoA will be implemented within Singapore's geographical coordinates between latitudes 1°09' North, 1°29' North and longitudes 103°36' East, 104°25' East **/Ref-37/. (Reference: Singapore Facts & Figures 2006 published by the Singapore Government)**

The validation team hereby confirms that the PoA description in the PoA-DD is accurate and complete in all respects and that there are no changes to the project activity/design or boundary as compared to the web-hosted PoA-DD.

To validate the accuracy and completeness of the PoA description validation team has verified various documents which are listed as below

1. Agreement between CME and 1st CPA Entities **/Ref- 8 to 12/**
2. Legal Agreement for replacement of existing luminaries in 6 Town councils signed between each individual town council and technology provider EM Services Pte. Ltd. **/Ref-5/**
3. Test Certificates of LED Luminaires provided by third party i.e. TUV Sud PSB. **/Ref-13/**



The validation team hereby confirms that the programme description in PoA-DD **/Ref-2/** is accurate and complete in all respects.

3.8 Operational and management arrangements (186)

A clear and transparent operational and management arrangement has been established by the management/coordinating entity. Complying with para.186/VVS, the Validation team has assessed the management system described in the PoA-DD in accordance with “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”.

As described in the PoA-DD, the CME is responsible for the management of PoA and monitoring plan for each individual CPA. Operational management plan presented by the CME in the PoA-DD, Version 02 dated 14/12/2012 **/Ref-2/** is found comprehensive and is in compliance with “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” [8]. The CME has not defined roles and responsibilities for various roles in the management of this PoA and hence CAR 10 was raised. It is evident that Monitoring plan for the PoA is established and comprises of important elements as listed below:

1. A record keeping system for each CPA under the PoA - *CME has established a record keeping system wherein each CPA will be maintaining specific operational records i.e. removal of luminaries with numbers, Operating hours, sample group, Power of Luminaries etc.*
2. A system /procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA – *CME has established a record keeping system wherein each CPA will be identified by an unique identification number and at the time of CPA inclusion CME will cross check with UNFCCC, CD4 CDM Data and VCS registry to ensure that the CPA is not registered either single CDM project or part of PoA. Also CME has made a provision to obtain declaration in writing as a Mandate from CPA operators that "there is no double counting of CERs from this CPA under any CDM Project or CPA in another PoA". This is found in compliance with EB 55 Annex 38 Para 6(i).*
3. The SSC CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity. – *CME has established an arrangement to ensure that CPA included in the PoA is not a de-bundled component of another PoA or CDM project activity. As per the eligibility check condition no 12 above, however the criteria for debundling established in the PoA-DD is not in accordance with Section II of EB Guideline EB 54 Annex 13, hence CAR 08 was raised.*
4. The CPA Operators are aware and have agreed that their activity is being subscribed to the PoA – *CME will be obtaining an authorization letter from each of the CPA implementers intending to participate under this PoA*

CME has provided Further background information on the monitoring plan in Appendix 5 of PoA-DD. Based on the document review, interviewing with CME during onsite visit , the Validation team confirms that competencies to check features of potential CPA's and ensure that each CPA meets all requirement and eligibility criteria before inclusion in the proposed PoA.



3.9 Eligibility criteria for inclusion a CPA in the PoA(196)

The PoA Demand side energy efficiency measures in building lighting systems project Managed by UGL Services Premas Operations Limited clearly establishes eligibility criteria for inclusion of a project as a CPA under the PoA in section B.2 of PoA-DD. There are 15 eligibility criteria identified and established by CME. The validation team has validated these criteria and found that selected criteria are in line with the CDM PoA requirement “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” [8] as well as the approved methodology used by the CME to develop this PoA. List of criteria validated by the validation team is as given below.

The eligibility criteria for inclusion of CPAs amongst others, require that no other CPA or CDM project involving implementation of energy efficient lighting systems in buildings (including residential, commercial and industrial) across Singapore is already registered or under validation in the selected geographical area i.e. Singapore.

Complying with Para.196/VVS, the Validation team has assessed the eligibility criteria for inclusion a CPA in the PoA in accordance with “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities” and confirms that:

- The eligibility criteria are verifiable
- The eligibility criteria are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA.
- The specified eligibility criteria in the PoA-DD are sufficient to ensure that all CPAs would comply with the CDM requirement applicable to the PoA, for details of eligibility criteria are:

Eligibility Criteria As per EB 65 Annex 3	Specific Eligibility Conditions Established by CME for inclusion of CPA in the PoA	Validation Opinion
Geographical boundary: The geographical boundary of CAP including commercial and residential buildings location set in the PoA which is geographical boundary of Singapore.	Each CPA will specify the distinct geographical location. This will contain the block number/name of the building and may also include the Street name in which such building is located. <u>Supporting documents:</u> Either Tender documents or contracts with suppliers which encompass the location of each building.	CME has clearly established the Physical / Geographical Boundary of the PoA in PoA-DD section B.2, hence this eligibility criteria is relevant.
A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA	Prior to registering a new CPA within the proposed PoA, the managing entity will check the CPA and PoA database (available on UNFCCC website) to ensure whether there exist a similar CPA which has been submitted for validation and registration as another CDM project or a CPA under a PoA within similar locations of a building (for e.g.	The Eligibility Criteria found valid and is verifiable through the Operational and Management Plan as presented in the PoA – DD.



	<p>staircases, corridor) in the similar distinct geographical location.</p> <p>In case the managing entity concludes that there already exists a similar CDM project activity or a CPA of another PoA (in the CDM cycle) implemented in the similar building location (for e.g. staircase, corridor) within the similar distinct geographical location, then it will not proceed with the registration of the particular CPA under this PoA. Thus, the managing entity shall avoid double counting of carbon credits.</p> <p><u>Supporting documents:</u> Agreement between project owners and CME</p>	
Technologies and Measures: The proposed luminaire technology has to achieve the efficiency of 75% or above	<p>The following documents shall be provided:</p> <ol style="list-style-type: none"> 1. Test results of LED luminaires (or) 2. Supplier's specifications/data sheet 	<p>CME has clearly defined the technology which will be applicable for the PoA implementation. PoA is intended to achieve energy efficiency by replacing energy intensive luminaires with more efficient LED or future generation luminaires. This can be verified using Test Certificates and suppliers specifications, and hence the eligibility criterion is applicable.</p> <p>CME has established minimum efficiency requirement for project luminaires as 75%, which is taken from the Test report of TUV (Sud) for the LED luminaires /Ref 13/</p>
Confirm that the start date of any CPA is not, 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.	<p>The start date of the CPA shall be established as the date of agreement signed between the LED supplier/contractor and project owner</p> <p>Supporting document: Agreement between the project owner and supplier/contractor</p>	<p>The eligibility criterion found in accordance with the PoA requirement and is found one of the important criteria. During Validation of PoA Validation team confirmed from the UNFCCC web site for the start date of the PoA and found that the eligibility criteria is in accordance with it. The criterion is verifiable during inclusion of the CPA in PoA in Future and hence acceptable.</p>
Compliance with Methodology Each CPA will follow the approved methodology; AMS-II.C, "Demand-side energy	The CPA-DD to give details on the compliance of methodology AMS-II.C, "Demand-side energy efficiency activities for specific technologies"	CME has decided to use AMS IIC, Version 14 as the approved small scale methodology. This criterion also can be verified



efficiency activities for specific technologies" version 14	version 14	during inclusion of CPA to PoA in future and hence acceptable.
The CPA is additional as demonstrated in the additionality criteria in section B.5. If the first approach is chosen, the micro scale eligibility has to be justified. If the second approach is chosen, one of the small scale additionality criteria has to be met.	<p>CPA-DD to justify the Additionality using guidance provided in PoA-DD.</p> <p>Any of the below supporting documents shall be provided</p> <p>(i) for first approach</p> <ol style="list-style-type: none"> 1. evidence of country status 2. certified rating tests 3. Relevant information in SSC-CPA-DD following the relevant Guidelines for Demonstrating Additionality of Micro scale Project Activities (Version 03). <p>(ii) for second approach</p> <ol style="list-style-type: none"> 1. production cost spreadsheet for financial barrier 2. technological description and risk analysis 3. Relevant information in SSC-CPA-DD following the additionality approaches set out in the PoA-DD. 	<ul style="list-style-type: none"> - CME has decided to demonstrate additionality at each CPA which will be included in this proposed PoA. - CME has adopted two approaches to demonstrate the additionality of CPA's, and both approaches are found verifiable and hence acceptable.
Each CPA has to be conducted a Local Stakeholder Consultation as well as Environmental Impact Assessment (EIA).	<p>Details of local stakeholder consultation will be provided in CPA-DD.</p> <p>Supporting Documents:</p> <ol style="list-style-type: none"> 1. Stakeholder presentation slides 2. Photos of the event 3. Attendees registry <p>The EIA is not required for the lighting projects in Singapore.</p> <p>Reference: http://app2.nea.gov.sg/data/cmsresources/20120209553102984609.pdf </p>	<p>The Eligibility criterion is found verifiable against the Local Regulatory requirements from the approval point of view and waste disposal point of view.</p> <p>Validation Team has confirmed that there is no mandatory regulation in host country Singapore to carry out Environmental Pollution control Study for project which is not resulted in any kind of Pollution. Section 36 of Environmental Pollution Control Act (EPCA) clearly specifies this requirement and hence the CME's argument on the EIA requirement is acceptable.</p>
Confirm of no public funding received by individual CPA	<p>CPA owner to give declaration to justify that there is no Diversion of ODA received by individual CPA owner</p> <p>Supporting Document: Declaration letter from Each CPA owner</p>	This criterion is also found verifiable and hence accepted.
Confirm that CPA apply the monitoring and sampling plan as defined in the SSC-PoA-DD	Each CPA-DD to give details on the monitoring plan according to the selected approved methodology.	Yes, this eligibility criterion enforces the monitoring and sampling plan as mentioned in the PoA DD.



	<p>The sampling groups will be calculated as per EB69, Annex 5, Version 2.0 "Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities", paragraph 50 states that:</p> $n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 \times 1.645^2 p(1-p)}$ <p>Where:</p> <p>n : Sample size</p> <p>N : Total number of households</p> <p>p : Our expected proportion</p> <p>1.645 : Represents the 90% confidence required</p> <p>0.1 : Represents the 10% relative precision ($0.1 \times 0.5 = 0.05 = 5\%$ points either side of p)</p>	<p>As there will several buildings will be involved in one CPA, CME has established a sampling plan for baseline monitoring and for project monitoring to obtain necessary / important parameters.</p> <p>This approach is found correct and in accordance with EB 65 Annex 2 and EB 69 Annex 5 requirements of Simple Random Sampling .</p>
<p>The CPA included in the PoA is not a de-bundled component of another CPA or CDM project activity.</p> <p>As per the Guidelines on assessment of de-bundling for SSC project activities, version 03.1 issued at the EB's 54th meeting,</p> <p>Paragraph 8 states: For the purposes of registration of a Programme of Activities (PoA),⁶ a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity,⁷ which satisfies both conditions (a) and (b) below:</p> <p>(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;</p> <p>(b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at</p>	<p>The CPA-DD has to be met either one of the point 8 or 10 in "GUIDANCE FOR DETERMINING THE OCCURRENCE OF DEBUNDLING UNDER A PROGRAMME OF ACTIVITIES (PoA)"</p> <p>Relevant information provided in CPA-DD as described in A.12 following the relevant de-bundling guidelines</p>	<p>CME has established debundling check mechanism as described in the PoA-DD section C.II, which is found in accordance with "GUIDANCE FOR DETERMINING THE OCCURRENCE OF DEBUNDLING UNDER A PROGRAMME OF ACTIVITIES (PoA)"</p> <p>This will ensure to verify that the CPA is not a debundled component of any large scale, small scale or a micro scale project activity.</p> <p>This eligibility criteria is also found verifiable and hence is acceptable.</p>



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<p>the closest point.</p> <p>Point 10 allows exemption from de-bundling check as follows:</p> <p>If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being is not a de-bundled component of a large scale activity.</p>		
<p>Confirm that scrapped existing lamps be checked independently</p>	<p>To be verified from records maintained by CPA implementer on scrapping.</p> <p><u>Supporting Document:</u></p> <ol style="list-style-type: none"> 1. Agreement between project owner and waste distributors 2. Photographs of removed luminaires 3. Bills & Disposal receipts 	<p>Scrap disposal records can be verified against each CPA to be included in future.</p> <p>This eligibility criterion is also found verifiable and hence it is acceptable.</p>
<p>Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation);</p>	<p>The CPA-DD to give details on the targeted group and distribution mechanism of lighting luminaires</p> <ul style="list-style-type: none"> - In case of Target group i.e. Existing building CPA should provide baseline monitoring of Energy consumption and Lux measurement data. - In case of Target group i.e. new Construction / Green field projects CPA should provide Stepwise approach for determining the baseline as prescribed under Paragraph 19 of Version 17.0 of the General guidelines to SSC CDM Methodologies. <p><u>Supporting document:</u></p> <ul style="list-style-type: none"> - Contract with ESCO for replacement of luminaires - baseline monitoring of Energy consumption - Baseline monitoring of Lux measurement data. - Stepwise approach for determining the baseline as 	<p>As per the PoA-DD description it is validated that CPA which involves replacement of inefficient luminaries with LED luminaries will be carried out by an appointed ESCOs, hence as per the common practice in host country Singapore, it is legally required to provide schedule of replacement where all details of target groups to be provided by the project owner to ESCOs, Baseline monitoring of energy consumption, and lux measurement data in case of existing buildings.</p> <p>And in case of new construction / Green field projects CPA should demonstrate the baseline using Paragraph 19 of version 17.0 of the general guidelines to SSC CDM Methodologies.</p> <p>Hence this eligibility condition is</p>



	prescribed under Paragraph 19 of Version 17.0 of the General guidelines to SSC CDM Methodologies.	found verifiable using contract documents for target group and hence it is acceptable
Where applicable, the conditions related to sampling requirements for the PoA in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities"	The CPA-DD to give details on sampling requirements in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities"	This eligibility criteria is also found verifiable, The sampling principle will be utilized for Baseline survey / Monitoring requirement during project scenario.
Where applicable, the conditions that ensure that every CPA (in aggregate if it comprises of independent sub units) meets the small-scale or micro scale threshold and remains within those thresholds throughout the crediting period of the CPA;	Confirmation with calculation provided in the following documents <ul style="list-style-type: none"> - Baseline monitoring information - CPA-DD and - Emission reduction Spread sheet (Transparent Calculations using applicable formulae from Approved methodology) 	CME will be ensuring this through Calculations provided in the Baseline information, CPA DD and Emission Reduction Spread sheets provided by the CPA Owner, hence this eligibility criteria found verification and therefore acceptable.
Baseline Measurement Period: As per AMS-II.C, "Demand-side energy efficiency activities for specific technologies" version 14, Electrical Power Demand (ρ_e) under paragraph 13: Power demand of baseline equipment is determined based on spot-measurement and/or short-term monitoring data. The Short-term monitoring should be conducted for a period of at least six hours.	CPA to give details on collection of historical records. Supporting Documents: <ol style="list-style-type: none"> 1. Baseline records (in excel formats with/without project owner's signature on it) 2. Manually recorded (with/without project owner's signature on it) 	This eligibility criterion found verifiable and hence accepted.

3.10 Baseline and monitoring methodology

3.10.1 Applicability of the selected baseline and monitoring methodology (77)

The steps taken to assess the relevant information contained in the PoA-DD against each applicability condition are described below.

Applicability condition (1): This methodology comprises activities that involve the installation of new, energy-efficient equipment (e.g. lamps, ballasts, refrigerators, motors, fans, air conditioners, pumping systems, and chillers) at one or more project sites. Retrofit as well as new construction (Greenfield) projects are included under this methodology. In the case of new construction projects, a stepwise approach is indicated for determining the baseline under paragraph 19 of version 17.0 of the general guidelines to SSC CDM methodologies.

The CPAs to be implemented under this PoA will involve installation and operation of: either



more energy efficient lighting luminaires replacing existing luminaires in existing buildings; or (b) more energy efficient lighting luminaires in new buildings, within distinct geographical locations across Singapore creating demand-side energy savings and reductions in greenhouse gas emissions. Hence this applicability condition is applicable to the proposed PoA. Validation team has validated this condition based on the description in the PoA-DD/**Ref-2/** and Technical Specification of Baseline luminaries **/Ref-34/** and Project Luminaries **/Ref-13/**. CME has established eligibility criteria No. 13 to verify compliance towards this Methodological Condition. As per the eligibility condition No.13, CME has made it mandatory to provide following information

- In case of Target group i.e. Existing building CPA should provide baseline monitoring of Energy consumption and Lux measurement data.
- In case of Target group i.e. new Construction / Green field projects CPA should provide Stepwise approach for determining the baseline as prescribed under Paragraph 19 of Version 17.0 of the General guidelines to SSC CDM Methodologies.

Applicability condition (2): This methodology is only applicable if the service level (e.g. rated capacity or output) of the installed, project energy-efficient equipment is between 90% and 150% of the service level of the baseline equipment. Examples of service levels are light output for lighting equipment, water output and temperature for water heating systems, and rated thermal output capacity of air conditioners. The relationship of the service level of the project energy-efficient equipment to the baseline equipment can be one to one replacement (e.g. replacement of inefficient refrigerator with new and efficient refrigerator) or many-to-one (e.g. replacement of small multiple chillers with a central chiller plant). In the latter case, the service level of the project and baseline can be compared on an aggregate basis.

Based on the description provided in the PoA DD, it is observed that CME has considered service level (Light Output) of the Baseline luminaries and Project luminaries to justify the applicability of this methodological Condition. CME has opted to compare Lux level in baseline scenario and lux level in Project scenario. This approach is acceptable by the Approved methodology. CME shall verify the lighting output of each and every replaced lighting equipment in sampled blocks to ensure that it will not be **significantly** smaller (90%) or **larger** (150%) than the baseline. CME has made it mandatory to monitor lux level in baseline scenario and in project scenario for sampled blocks. CPA owner will submit the supporting documents at the time of CPA inclusion and these documents will include

1. Baseline lux level measurement of sampling blocks
2. Project lux level measurement of sampling blocks

Based on the description in PoA DD, validation team confirms that this applicability condition is applicable to the proposed PoA it is justified satisfactorily by the CME.

Applicability condition (3): Requirements pertaining to the baseline of the retrofit projects and projects involving capacity increase are indicated in paragraphs 20 to 21 in the above cited general guidelines to SSC CDM methodologies. In the event that project output in year y is greater than the average historical output (average of the three most recent years prior to the project implementation) and the demonstration of the baseline for the incremental capacity is not undertaken, the value of the output in year y is capped at the value of the historical average output level.*

* A maximum of +10% variation is permitted.



The PoA will not involve retrofitting activities, it will involve either replacement or green field projects hence this applicability condition is **not applicable** for this project activity as the proposed CPA does not involve to retrofit/capacity addition in the baseline.

Applicability condition (4): If the energy-efficient equipment contains refrigerants, then the refrigerant used in the project case shall have no ozone depleting potential (ODP).

This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment. There will be no refrigerant involve in the CPA under this PoA. The PoA intend to improve energy efficiency in lighting systems by replacing energy intensive luminaries with LED luminaries, which are considered to be more energy efficient than CFL and other baseline luminaries, hence no refrigerant is involved.

*Applicability condition (5): This methodology credits emission reductions only due to the reduction in electricity and/or fossil fuel consumption from use of more efficient equipment. However, the calculation of project emissions shall include any incremental emissions, as compared to the baseline, associated with refrigerants used in the project equipment.**

This methodology credits emission reductions only due to the reduction in electricity consumption from use of more efficient equipment. There will be no refrigerant involve in the CPA under this PoA.

Applicability condition (6): 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.

CME is intended to develop micro scale or small scale projects, as the energy consumption for lighting system is not significant and in a building system 60 GWH Electricity consumption for lighting is hardly possible. CME shall verify this condition at each CPA level at the time of inclusion through transparent calculations. Hence validation team confirms that this applicability condition is applicable for the Proposed PoA.

Applicability condition (7): Selection of baseline emission calculation method as prescribed by the Approved Methodology AMS II.C Version 14

Option 1 – Constant load equipment

Option 2 – Variable load device(s), regression approach

Option 3 – Production efficiency/specific energy consumption approach

CME has identified 03 options as prescribed by the Approved methodology AMS II.C, Version 14 and it is mentioned that any option is acceptable to calculate baseline calculation method, this is clearly explained by the CME in PoA DD section B.3. As per this requirement Each CPA-DD to give details on selection of baseline calculation method.

The eligibility criteria of the applicability of the selected baseline and monitoring methodology are set as given below.

* See EB 34 report, paragraph 17.



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Technologies and Measures: The proposed luminaire technology has to achieve the efficiency of 75% or above	<p>The following documents shall be provided:</p> <ul style="list-style-type: none"> - Test results of LED luminaires (or) - Supplier's specifications/data sheet 	<p>CME has clearly defined the technology which will be applicable for the PoA implementation. PoA is intended to achieve energy efficiency by replacing energy intensive luminaires with more efficient LED or future generation luminaires. This can be verified using Test Certificates and suppliers specifications, and hence the eligibility criteria is applicable.</p> <p>CME has established minimum efficiency requirement for project luminaires as 75%, which is taken from the Test report of TUV (Sud) for the LED luminaires /Ref -13/</p>
Compliance with Methodology Each CPA will follow the approved methodology; AMS-II.C, "Demand-side energy efficiency activities for specific technologies" version 14	The CPA-DD to give details on the compliance of methodology AMS-II.C, "Demand-side energy efficiency activities for specific technologies" version 14	CME has decided to use AMS IIC, Version 14 as the approved small scale methodology. This criterion also can be verified during inclusion of CPA to PoA in future and hence acceptable.
Where applicable, the conditions that ensure that every CPA (in aggregate if it comprises of independent sub units) meets the small-scale or micro scale threshold and remains within those thresholds throughout the crediting period of the CPA;	<p>Confirmation with calculation provided in the following documents</p> <ul style="list-style-type: none"> - Baseline monitoring information - CPA-DD and - Emission reduction Spread sheet (Transparent Calculations using applicable formulae from Approved methodology) 	CME will be ensuring this through Calculations provided in the Baseline information, CPA DD and Emission Reduction Spread sheets provided by the CPA Owner, hence this eligibility criteria found verification and therefore acceptable.
<p>Baseline Measurement Period: As per AMS-II.C, "Demand-side energy efficiency activities for specific technologies" version 14, Electrical Power Demand (pi) under paragraph 13:</p> <p>Power demand of baseline equipment is determined based on spot-measurement and/or short-term monitoring data. The Short-term monitoring should be conducted for a period of at least six hours.</p>	<p>CPA to give details on collection of historical records.</p> <p>Supporting Documents:</p> <ol style="list-style-type: none"> 3. Baseline records (in excel formats with/without project owner's signature on it) 4. Manually recorded (with/without project owner's signature on it) 	This eligibility criterion found verifiable and hence accepted.

The DOE hereby confirms that the selected baseline and monitoring methodology AMS-II.C."Demand-side energy efficiency activities for specific technologies", Version 14.0 **[4]**, Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01



[5] is applicable to CPAs to be included in the PoA, which complies with all the applicability conditions therein.

3.10.2 PoA boundary (192)

Boundary for the PoA in terms of geographical area is defined as Singapore, and the PoA is intended to achieve energy efficiency in lighting system for Residential, Commercial or industrial buildings hence it is confirmed that CPA's which will be included under this PoA, will involve energy efficiency improvement projects for lighting systems in such buildings located in host country Singapore.

The eligibility criteria of the CPA boundary are set as Each CPA will specify the distinct geographical location. This will contain the block number/name of the building and may also include the Street name in which such buildings are located.

Bureau Veritas Certification confirms that in establishing the boundary of the PoA, the project participants have taken into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary.

3.10.3 Baseline identification (94-95)

The steps taken to assess the requirement given in paragraph 94 and 95 of the VVS are described below:

CME has selected an approved methodology AMS II.C, Version 14 "Demand-side energy efficiency activities for specific technologies" to develop the proposed Programme of Activity in host country Singapore. The PoA is intended to achieve Energy efficiency in the Lighting system for various buildings i.e. Residential, Commercial and industrial. The Energy efficiency will be achieved by two ways as described below

- (a) Installation and operation of more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings: This activity will include replacement of baseline luminaries with more energy efficient LED luminaries to reduce the electrical energy consumption which would have occurred during pre-project scenario in existing buildings due to the inefficient Lighting system consisting of luminaries such as T5, T8 and CFL etc. in Residential, Commercial or Industrial buildings in Singapore..
- (b) Installation and operation of more energy efficient lighting luminaires in new buildings; located in distinct geographical locations across Singapore. : This activity involves greenfield projects for residential, commercial and industrial buildings where Efficient lighting systems (LED or Equivalent Technology) will be installed to achieve energy efficiency.

CME has established above two basic criteria for identifying baseline scenario for CPA's to be included in future in identified geographical boundary. This also clearly guides that no retrofit of luminaries / lighting system is allowed to include in this proposed programme of Activity.

As per the methodology AMS II.C./version 14, the determination of energy baseline depends on whether the energy displaced is fossil fuel or electricity. The Proposed Programme of Activities involves the baseline scenario of displacement of electrical energy in existing or new residential, commercial or Industrial buildings in Singapore.

This is clearly specified in the PoA DD section B.4 of Part II.

Validation Team further verified Para 9 of AMS II.C, Version 14 requirement on the Baseline identification and confirmed that baseline scenarios identified by the CME are in accordance with Approved methodology.

As per the approved methodology Option I, II and III are applicable for identifying baseline for the future CPA's to be included in this proposed Programme of Activity (PoA). Validation team has validated the applicability of baseline equations against each individual option as given in the following table.

Option 1	$BE_y = E_{BL,y} \times EF_{CO_2,ELEC_y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (1)$ $E_{BL,y} = \sum_i (n_i \times \rho_i \times o_i) / (1 - l_y) \quad (2)$	Equation (1) and Equation (2) are applicable for retrofit and greenfield projects where constant load conditions are applicable. However CME has explained in the PoA DD that there is no retrofitting of lighting systems will be done, only replacement of Luminaries in baseline will be replaced with more energy efficient Luminaries (LED Technology). It is confirmed by the CME in PoA DD section B.3.
Option 2	$BE_y = E_{BL,y} \times EF_{CO_2,ELEC_y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (4)$ $E_{BL,y} = \sum_i (n_i \times kWh) / (1 - l_y) \quad (3)$	As per the approved methodology Option 2 is applicable only for retrofit activity with variable load conditions, hence equations provided under Para 16 are not applicable for the proposed Programme of Activity (PoA) hence equation (3) and Equation (4) will not be utilized by any future CPA's to be included under this PoA. Validation Team has validated this by verifying the technical specifications of Baseline luminaries (CFL, T5, T8 type) /Ref-34/ that will be replaced during project scenario and those Luminaries /Ref-13/ (With LED Technology) which will be installed during project activity. It is confirmed by the CME in PoA DD section B.3.
Option 3	$BE_y = E_{BL,y} \times EF_{CO_2,ELEC_y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (5)$ $E_{BL,y} = \sum_i [EER \times Q_{i,y} / (1 - l_y)] \quad (6)$	As per Para 10 of approved methodology AMS II.C Version 14, this option is not applicable for the greenfield projects, and thus applicable for replacement activity with production efficiency / Specific energy consumption approach. For demonstrating the baseline

		through this option CPA owner has to provide specific energy consumption in the baseline (MWh / Unit /year).
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Based on the above assessment, the validation team hereby confirms that:

- (a) All the assumptions and data used by the project participants are listed in the PoA-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;
- (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;
- (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 PoA.

3.10.4 Algorithms and/or formulae used to determine emission reductions (99-100)

The steps taken to assess the requirement outlined in paragraph 99 the VVS are described below:

According to the PoA-DD, a typical CPA will apply AMS-II.C. Version 14 [4] to determine emission reductions. Based on the identified Project Scenario of this PoA, the emission reductions are calculated as follows:

Baseline Emissions

In accordance with paragraph 13 of selected methodology, baseline will be the product of the baseline energy consumption of equipment/appliances and the emission factor for the electricity displaced.

CME has provided three options for calculating baseline emissions and the approaches are found in accordance with the approved methodology applied to this proposed PoA.

Option 1:

$$BE_y = E_{BL,y} \times EF_{CO_2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (1)$$

$$E_{BL,y} = \sum_i (n_i \times \rho_i \times o_i) / (1 - l_y) \quad (2)$$

Where:

BE_y	Baseline emissions in year y (tCO ₂ e)
$E_{BL,y}$	Energy consumption in the baseline in year y (kWh)
$EF_{CO_2,ELEC,y}$	Emission factor in year y calculated in accordance with the provisions in AMS-I.D (tCO ₂ /MWh)



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\sum_i	Sum over the group of “i” devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity
n_i	Number of devices of the group of “i” devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year
ρ_i	Power of the devices of the group of “i” baseline devices (e.g., 40W incandescent bulb, 5hp motor). In the case of a retrofit activity, “power” is the weighted average of the devices replaced. In the case of new installations, “power” is the weighted average of devices on the market
o_i	Average annual operating hours of the devices of the group of “i” baseline devices
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country. This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable
$Q_{ref,BL}$	Average annual quantity of refrigerant used in the baseline to replace the refrigerant that has leaked (tonnes/year). Values from Chapter 7: Emissions of fluorinated substitutes for Ozone depleting substances, Volume 3, Industrial Processes and Product Use, 2006 IPCC Guidelines for National Greenhouse Gas Inventories may be used
$GWP_{ref,BL}$	Global Warming Potential of the baseline refrigerant (t CO ₂ e/t refrigerant)

Option 2:

$$E_{BL,y} = \sum_i (n_i \times kWh_i) / (1 - l_y) \quad (3)$$

$$BE_y = E_{BL,y} \times EF_{CO_2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (4)$$

Where:

kWh_i	Annual average electric energy use for the equipment in group i . Based on regression analysis ⁴ of relevant independent variables that have a physical influence on energy use, for example outside air dry bulb temperature for space cooling applications. Takes for example the form of: $kWh = f(x) + \varepsilon$, where x are the independent variable(s) causing the device(s) to use energy and ε is the error term The data for the analysis must cover a period of 12 continuous months. The data measurement interval will depend on the application but is typically 0.25 to 1.0 hour in length
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Option 3:

$$BE_y = E_{BL,y} \times EF_{CO_2,ELEC,y} + Q_{ref,BL} \times GWP_{ref,BL} \quad (5)$$

$$E_{BL,y} = \sum_i [EER_i \times Q_{i,y} / (1 - l_y)] \quad (6)$$

Where:

EER_i	Specific energy consumption in the baseline (MWh/unit/year) for equipment in group i . EER is calculated as the total annual energy consumed in the baseline divided by the total quantity of annual output of the baseline equipment in the baseline. A group is a collection of devices sharing similar sizes, functions, schedules, outputs or loads. The calculation of EER must be based on data recorded at a fixed interval over a period of at least 12 continuous months. Examples of the recording interval are 15 minute, hourly, daily. EER values must be reported with 10% or higher precision at the 90% confidence level
$Q_{i,y}$	Total quantity of output in project year y for equipment in group i

Since project activity does not involve use of refrigerant, baseline emissions are:

$$BE_y = E_{BL,y} \times EF_{CO_2,ELEC,y} \quad (7)$$

Calculation of CO2 emission factor of the grid in year y (tCO₂/MWh for ex-ante calculation of emission reductions)

As per AMS-I.D., Version 17, paragraph 12 states:

The emission factor can be calculated in a transparent and conservative manner as follows:

- (a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the “Tool to calculate the Emission Factor for an electricity system”;

OR

- (b) The weighted average emissions (in tCO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations shall be based on data from an official source (where available) and made publicly available.

The DNA (National Environment Agency) of Singapore itself adopts the “Tool to calculate the emission factor for an electricity system”(version 2.2.1) and calculated the combined margin emission factor for the national grid. Due to confidentiality, NEA has not intended to release grid connected power plants data and published the calculated figure in their website (http://app2.nea.gov.sg/clean_development_mechanism.aspx). The power plants data will be available for validation review upon request made by Designated Operational Entity (DOE). Validation Team has visited the Office of Energy Market Authority with DNA officials to verify the calculations. During verification it was observed that the calculations are based on the requirements prescribed under “Tool to calculate the emission factor for an electricity system”(version 2.2.1)” and hence accepted.



Grid	Simple Operating Margin	Build margin	Combined Margin
Singapore National Grid	0.5146 (It is the average value of three years Simple operating margin s published by NEA. CME has used 2009 – 2011 vintage data as the CPA is implemented in 2011.)	0.4578 (It is the build margin for the year 2011, the CPA implementation was done in 2011, and hence this value is appropriate.)	0.4862 This value is the calculated value using Eq. $EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$. CME has applied this conservative value as emission factor for the Singapore Grid and utilized in the calculation of emission reductions for this CPA.

Project Emissions

$$PE_y = EP_y \times EF_{CO_2,y} \quad (8)$$

Where:

PE_y	Project emissions in year y (tCO ₂ e)
EP_y	Energy consumption in project activity in year y. This shall be determined ex post based on monitored values
$EF_{CO_2,y}$	Emission factor for electricity or thermal baseline energy. The emissions associated with grid electricity consumption should be calculated in accordance with the procedures of AMS-I.D. For fossil fuel displaced reliable local or national data for the emission factor shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain

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

$$E_{BL,y} = \sum_i (n_i \times \rho_i \times o_i) / (1 - l_y) \quad (9)$$

\sum_i	Sum over the group of “i” devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year, implemented as part of the project activity
n_i	Number of devices of the group of “i” devices (e.g., 40W incandescent bulb, 5hp motor) replaced, for which the project energy efficient equipment is operating during the year
ρ_i	Power of the devices of the group of “i” baseline devices (e.g., 40W incandescent bulb, 5hp motor). In the case of a retrofit activity, “power” is the weighted average of the devices replaced. In the case of new installations, “power” is the weighted average of devices on the market
o_i	Average annual operating hours of the devices of the group of “i” baseline devices
l_y	Average annual technical grid losses (transmission and distribution) during year y for the grid serving the locations where the devices are installed, expressed as a fraction. This value shall not include non-technical losses such as commercial losses (e.g., theft/pilferage). The average annual technical grid losses shall be determined using recent, accurate and reliable data available for the host country.

	<p>This value can be determined from recent data published either by a national utility or an official governmental body. Reliability of the data used (e.g., appropriateness, accuracy/uncertainty, especially exclusion of non technical grid losses) shall be established and documented by the project participant. A default value of 0.1 shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable</p>
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Leakage Emission

Leakages will be neglected because the replaced equipments will be scrapped and an independent monitoring of the scrapping of replaced equipments will be implemented in relation of each CPA in compliance with the requirements of the applied baseline and monitoring methodology.

Emission Reduction

$$ER_y = BE_y - PE_y \quad (10)$$

Where,

ER_y	Emission Reduction in year y (tCO ₂ e/yr)
BE_y	Baseline Emission in year y (tCO ₂ e/yr)
PE_y	Project Emission in year y (tCO ₂ e/yr)

Based on the above assessment, the validation team hereby confirms that:

- (a) All assumptions and data used by the project participants are listed in the PoA-DD, including their references and sources;
- (b) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PoA-DD;
- (c) All values used in the PoA-DD are considered reasonable in the context of the proposed CDM project activity;
- (d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
- (e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PoA-DD.

3.11 Additionality of PoA

3.11.1 Start date of the PoA/CPA (193)

The eligibility criteria of the start date for inclusion of CPA has been set as criteria number 4, which is reproduced as given below

4	<p>Confirm that the start date of any CPA is not, 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.</p>	<p>The start date of the CPA shall be established as the date of agreement signed between the LED supplier/contractor and project owner</p> <p>Supporting document: Agreement between the project owner and supplier/contractor</p>
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Bureau Veritas Certification confirms that the start date of any CPA will not be prior to the commencement of the validation of the PoA, which is the date of the CDM-PoA-DD is first published for global stakeholder consultation. Validation team has validated the date of publication of PoA from UNFCCC website. Validation team herewith confirmed that the PoA was published twice and the validation details are given as below.

Date of Publication	Web Hosting Details	Result
14/08/2010	PoA was web hosted for 1 st time with Specific CPA.	During validation it was observed that the start date of 1 st CPA which was identified initially, was after the start date of the PoA i.e the date of Webhosting 14/08/2010. Hence validation team rejected the 1 st CPA for inclusion.
08/11/2012	PoA was webhosted for 2 nd time with new CPA i.e. "Replacement of existing luminaires with LED lighting luminaires in several buildings across 6 Town Councils in Singapore"	The start date of CPA, which was submitted during 2 nd webhosting was verified by the validation team and found that it is after 14/08/2010. The start date of the CPA titled "Replacement of existing luminaires with LED lighting luminaires in several buildings across 6 Town Councils in Singapore" was validated by the Validation team using agreement between EM services (Technology provider) and 6 Town Councils Dated 18/07/2011 for replacement of baseline luminaries with LED Luminaries

3.11.2 Demonstration of additionality of the PoA as a whole

Validation team has assessed the additionality of a PoA in accordance with Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities.

It is confirmed by the Validation Team that the additionality will be demonstrated at the CPA level and, CME has established relevant eligibility criteria, which is explained as given below.

The eligibility criteria of the additionality were set as criteria No.6 which is mentioned in the PoA DD section B.2. The eligibility criteria is reproduced as given in the below table.

6	The CPA is additional as demonstrated in the additionality criteria in section B.5. If the first approach is chosen, the micro scale eligibility has to be justified. If the second approach is chosen, one of the small scale additionality criteria has to be met.	CPA-DD to justify the Additionality using guidance provided in PoA-DD. Any of the below supporting documents shall be provided (i) for first approach 1 evidence of country status 2 certified rating tests 3 Relevant information in SSC-CPA-DD following the relevant Guidelines for Demonstrating Additionality of Micro scale Project Activities (Version 03). (ii) for second approach a. production cost spreadsheet for financial barrier b. technological description and risk analysis c. Relevant information in SSC-CPA-DD following the additionality approaches set out in the PoA-DD.
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From the above eligibility criteria, validation team confirms that the additionality of each CPA to be included in the PoA is assessed and determined by any one of the following approaches:



- ✓ Approach 1: According to “Guidelines for demonstrating additionality of micro-scale project activity” Version 03 [7]
- ✓ Approach 2: As per “Guidelines on the demonstration of additionality of small – scale project activities” Version 09.0 (EB 68 Annex 27) [9], the additionality of the CPA is demonstrated by proving any one of the barrier listed below
 - Investment Barrier
 - Technological Barrier
 - Barrier due to prevailing practice
 - Other Barrier

The validation team hereby confirms that the approaches described in the PoA-DD for the assessment and demonstration of additionality are appropriate.

Bureau Veritas Certification confirms that none of the implemented CPA would occur in the absence of CDM.

3.12 Monitoring plan (198)

The validation team hereby confirms that the monitoring plan complies with the requirements of the methodology.

The steps taken to assess whether the monitoring arrangements described in the monitoring plan are feasible within the programme design are described below.

As per the PoA-DD, a central database will be maintained by the CME for each CPA under the PoA. The CME will continuously update a list of all CPAs as well as collect the monitoring information of all participating CPAs for the purpose of the verification by DOE. All of monitoring information will be collected by the CME during the monitoring period and the forms a monitoring report for verification. The monitoring plan established by the CME is having 06 important elements to ensure accuracy of the monitoring as listed below

1. Off-site monitoring system – Monitoring during inclusion of CPA
2. Onsite monitoring system – Onsite monitoring during operation of CPA
3. Annual monitoring system – Monitoring the non-metered blocks
4. Monitoring system of faulty luminaires and timer switch

Other requirements,

5. Recommendations for improvisation in the monitoring plan
6. Quality assurance and data archiving procedure

The responsibility for monitoring by the CME and CPA implementers clearly indicate in Section C “Management system”, Section B.7.2 and Appendix 5 of the PoA-DD. The CME will verify all of emission reductions generated by all CPAs under the PoA.

By reviewing the PoA-DD, the validation team considers that a transparent system for monitoring has been implemented by the CME to ensure all participating CPAs being properly monitored and verified to ensure that no double accounting occurs.

From the description provided in PoA DD, validation team observed that CME has applied sampling principles for determining Sample size for the relevant data parameter (which is to be monitored) will be determined in accordance with the guidelines available under the “General guidelines for sampling and survey for SSC project activities”. As per these guidelines, sample size may be determined using sampling software.



For estimating the representative sample size the managing entity has used Simple Random Sampling approach and used Equation (1) as provided in the EB 69 Annex 5 for calculation of the representative sample size. Each CPA under this PoA will use the Statistical Formula provided in the Equation (1) of EB 69 Annex 5 to determine the sample size for those parameters which are monitored for the purpose of the “Sampling Plan Documentation”.

The validation team has assessed the sampling plan and confirms that complies with “Standard for sampling and surveys for CDM project activities and programme of activities” (version 02.0).

The validation team hereby confirms that the monitoring plan complies with the requirements of the methodology AMS II.C, Version 4.

3.13 Environmental impacts (199)

The CME has undertaken an analysis of environmental impacts CPA level.

3.14 Local stakeholder consultation (201)

The CME has undertaken the local stakeholder consultation at CPA level.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PoA-DD using methodology AMS II.C, Version 14 was webhosted on the UNFCCC for global stakeholder's comments as per CDM requirements. The programme was webhosted from 09/10/2012 to 08/11/2012.

No comments were received.



5 VALIDATION OPINION

Bureau Veritas Certification has performed a validation of the “Demand side energy efficiency measures in building lighting systems” in Singapore. The validation was performed on the basis of UNFCCC criteria and host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the design and the baseline and monitoring plan; ii) follow-up interviews with stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

By reviewing VVS, PS and Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities, and “General Guidelines for Sampling and Surveys for Small Scale CDM Project Activity” etc, Bureau Veritas Certification is of the opinion that management system of CME is robust and efficient to ensure eligibility and quality of CPAs. Eligibility criteria are sufficient so that the inclusion of CPAs could fulfill all requirements of EB rules. Emission reductions attributable to the CPA under the PoA are additional to any that would occur in the absence of the PoA, and hence are likely to be achieved.

The review of the PoA-DD (01) and PoA-DD (02) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the PoA correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria. Bureau Veritas Certification concludes “Demand side energy efficiency measures in building lighting systems” meets all stated criteria and thus requests registration of “Demand side energy efficiency measures in building lighting systems” as PoA.



6 REFERENCES

Category 1 Documents:

Documents provided by Type the name of the company that relate directly to the GHG components of the PoA.

- /1/ PoA – DD (GSP Rev)
- /2/ PoA –DD (Rev. 02)
- /3/ Letter of Approval from Host Party Singapore
- /4/ Confirmation on change in entity name from “United Premas Ltd. to UGL Services Premas Operations Limited, issued by DNA Singapore Dated 24/12/2012.
- /5/ Contract Agreement – For supply and installation of Light Emitting Diode Luminaries at HDB blocks between Town Councils and EM Services., Dated 18/07/2011.
- /6/ Sub Contract agreement between EM Services Pvt. Ltd. and Davex Singapore Ltd. For supply and installation of Light Emitting Diode Luminaries at HDB blocks, Dated 01/07/2011.
- /7/ Letter of Authorization for CPA inclusion issued by Holland-Bukit Panjang Town Council, Dated 10/01/2011.
- /8/ Contract Agreement –For appointment of UGL Premas Services Operations Ltd. as Coordinating and management agency and or including 1st CPA in the PoA, between Ang Mo Kio Town Council and UGL Premas Services Operations Ltd. , Dated 22/09/2011
- /9/ Contract Agreement –For appointment of UGL Premas Services Operations Ltd. as Coordinating and management agency and or including 1st CPA in the PoA, between Marine Parade Town Council and UGL Premas Services Operations Ltd. , Dated 22/09/2011
- /10/ Contract Agreement –For appointment of UGL Premas Services Operations Ltd. as Coordinating and management agency and or including 1st CPA in the PoA, between Moulmein Kallang Town Council and UGL Premas Services Operations Ltd. , Dated 22/09/2011
- /11/ Contract Agreement –For appointment of UGL Premas Services Operations Ltd. as Coordinating and management agency and or including 1st CPA in the PoA, between Pasir Ris – Punggol Town Council and UGL Premas Services Operations Ltd. , Dated 22/09/2011
- /12/ Contract Agreement –For appointment of UGL Premas Services Operations Ltd. as Coordinating and management agency and or including 1st CPA in the PoA, between Tampinese Town Council and UGL Premas Services Operations Ltd. , Dated 22/09/2011
- /13/ Notiication of test results of luminaries for compliance test with HDB / EM Services – Technical Specifications for general 2 feet LED luminaries and recessed LED Luminaries – Test Report by third party TUV SUD PSB, Singapore.
- /14/ Singapore Grid Emission Factor Published Document by National Environmental Agency of Singapore, Dated 20/04/2012 on its web site
http://cms.nea.gov.sg/clean_development_mechanism.aspx
- /15/ Data collected from SP Services Limited on Transmission loss based on the methodology approved by the EMA (Energy Market Authority), Government of Singapore for Transmission Loss Factor of Singapore Grid
<http://www.singaporepower.com.sg/irj/servlet/prt/portal/prtroot/docs/guid/e07c2526-5c6d->



- [2e10-ed80-ef5ed6a7aae2?spstab=Contestability](#)
- /16/ Declaration by the CPA Entity for not Availing public funding, Dated
 - /17/ Letter from the Supplier of Energy meter Landis +Gyr Pte. Ltd. for confirmation on Calibration Frequency of Electronic Energy meter, Dated 20/05/2010
 - /18/ Technical Specification of Programmable Relay ZEN V2 used for controlling Timers.
 - /19/ Disposal Receipt from Incineration Plant for proving scrapping of Baseline luminaries in accordance with Local Environmental Regulations.
 - /20/ Permits and License for disposal of baseline luminaries.
 - /21/ Proof of disposal of baseline luminaries in the form of Photos.
 - /22/ Baseline luminaries disposal weight summary
 - /23/ Baseline lux level measurement records of sampling blocks
 - /24/ Project lux level measurement records of sampling blocks
 - /25/ Manufacturers Specification for the LED Luminaries installed in Project Scenario Make Aztech
(http://www.azelite.com/surfacemountedlights_LF.html)
 - /26/ Publically available document on the Lifetime of LED - From US Department of Energy, Energy Efficiency and Renewable energy
http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/lifetime_white_leds.pdf
 - /27/ Baseline KWh monitoring records for sampled blocks in each town council.
 - /28/ Installation Report of Project Luminaries
 - /29/ Handing over Document to Each individual town council by EM services
 - /30/ Power Circuit Diagram at each switch room showing the control system.
 - /31/ Notice / advertisement in local Daily newspaper for inviting Stake holder for the meeting.
 - /32/ Stake Holders Consultation meeting Attendance Record
 - /33/ Stake Holders Consultation Meeting Presentation
 - /34/ Tender Document for the Replacement of Baseline luminaries with LED Luminaries in 6 Town councils.
 - /35/ Guidelines for Pollution control (PC) Study by Central Building Plan department of Singapore.
 - /36/ Stake Holder Consultation comments and responses.
 - /37/ Singapore Facts & Figures published by the Singapore Government

**Category 2 Documents:**

Background documents related to the design and/or methodologies employed in the design or other reference documents.

- /1/ COMPONENT PROJECT ACTIVITY DESIGN DOCUMENT FORM (F-CDM-CPA-DD), Version 03.0
- /2/ Clean Development Mechanism Validation and Verification Standard, Version 05.0
- /3/ Clean Development Mechanism Project Standard, Version 02.1
- /4/ CDM Approved Simplified baseline and monitoring methodology AMS II.C, Version 14 – Demand Side energy efficiency activities for specific technologies.
- /5/ Tool to calculate baseline, project and/or leakage emissions from electricity consumption”
- /6/ Tool to calculate emission factor of an electricity system, Version 02.2.1
- /7/ GUIDELINES FOR DEMONSTRATING ADDITIONALITY OF MICROSCALE PROJECT ACTIVITIES, Version 04.0 (EB 68 Annex 26)
- /8/ Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities
- /9/ Guidelines on the demonstration of additionality of small – scale project activities” Version 09.0 (EB 68 Annex 27)
- /10/ Sampling and survey for CDM Project Activities and Programme of activities, version 03.0 (EB 69 Annex 4)

Persons interviewed:

List persons interviewed during the validation or persons that contributed with other information that are not included in the documents listed above.

- /1/ Mr. Panchaksharam Thirumalavan
- /2/ Mr. Ng Koon Siang
- /3/ Mr. Patrick Cheng
- /4/ Mr. David Ho
- /5/ Mr. Velu

7 CURRICULA VITAE OF THE DOE'S VALIDATION TEAM MEMBERS

Mr. Ram M. Desai	Bureau Veritas Certification, Singapore	<p>Team Leader, Climate Change Lead Verifier,</p> <p><i>Environmental Engineer with over all 13 years of experience in various industries related to Water & Waste water engineering design, installation & Commissioning, Integrated Facility Management for Environmental Services operations in various industries i.e Automotive, Pharmaceutical , IT & Electronics (With Clean Room).</i></p> <p><i>Management System Implementation and Maintenance, Green Building concept implementation, Lean Management Implementation, Water & Waste Water engineering Design & project Management, Project Environmental Compliance etc for a construction company.</i></p> <p><i>He is the lead auditor for Environment management system, Quality management system and Occupational health and safety management system and his auditing experience spans for 3 year with BVCI & BVCS. He has undergone intensive training on Clean Development Mechanism and was trained as Lead Verifier for CDM in the year 2005 and working as a lead Verifier for validation and verification of CDM/VCS projects</i></p>
Ms. So Shuk Ling	Bureau Veritas Certification, Singapore	<p>Team Member, Climate Change Verifier.</p> <p><i>She is Bachelor degree in Chemistry and statistic and Master degree in Manufacturing and Polymer Science. He has been working in auditing for quality and Environmental management system more than 9 years and in Electronics Manufacturing company more than 8 years. She has undergone intensive training on Clean Development Mechanism.</i></p>
Murugappan Palanisamy (Technical Specialist)	Bureau Veritas Marine, Singapore	<p>Technical Specialist (Site Visit)</p> <p><i>He is Bachelor of Engineering in Electrical and Electronics. He is working with Bureau Veritas Marine as Electrical Engineer. He is working in Electrical engineering field since last 09 years and is having reach hands on experience in designing, installation, commissioning of electrical systems for various applications in marine and oil and gas sector.</i></p> <p><i>He is also having experience in carrying out inspections of various marine equipment including electrical panels, rotating equipments, HVAC equipment's and operations of such equipment's.</i></p>
Mr. H.B. Muralidhar	Bureau Veritas Certification, India	<p>Technical Reviewer, Climate Change Lead Verifier.</p> <p><i>(Internal Reviewer) Lead auditor in Bureau Veritas Certification for Environment Management System, Quality Management System and Occupational Health and Safety Management System. Graduate in Electrical Engineering with 25 years of experience power generation and distribution related fields as well as in management system auditing. He is the Lead auditor for Environmental Management System, Quality Management system and Occupational Health and Safety Management System. He has undergone intensive training on Clean Development Mechanism. He is the technical expert & conducted Validation / Verification for more than 50 CDM Projects</i></p>



8 APPENDIX A: SMALL-SCALE CDM PROGRAMME OF ACTIVITIES VALIDATION PROTOCOL

TITLE OF POA : DEMAND SIDE ENERGY EFFIECIENCY MEASURES IN BUILDING LIGHTING SYSTEMS.

Table 1 Validation requirements based on VVS version 05.0 (EB 65 Annex 04), PS version 05.0 (EB 65 Annex 5), PCP version 02.0 (EB 66 Annex 64), PoA Standard version 03.0 (EB 65 Annex 3) and Guidelines for completing the SSC-PoA-DD form version 03.0 (EB 66 Annex 13)

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
Part I Programme of activities (PoA)					
A General description of PoA					
A.1 Title of the PoA					
A.1.1 Is the title of the proposed PoA provided?	DD PS	31	Yes, the title of the PoA is “Demand Side Energy Efficiency Measures in Building Lighting Systems”	OK	OK
A.1.2 Is the current version number of the SSC-PoA-DD indicated?	DD		Yes Current Version number of the Webhosted PoA –DD is Version 01 Dtd. 20/08/2012	OK	OK
A.1.3 Is the completion date of the SSC-PoA-DD provided in DD/MM/YYYY format?	DD		Yes, 20/08/2012	OK	OK
A.2 Purpose and general description of the PoA					
A.2.1 Is policy/measure or stated goal that the PoA seeks to promote described?	DD PS	139	Yes, PoA-DD Section A.2 is provided with the information on the Policy measure. The Goal of proposed PoA is “to significantly contribute towards energy efficiency measures by reducing the consumption	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			of electricity in building lighting systems”		
A.2.2 Is a framework developed for the implementation of the proposed PoA and inclusion of CPAs under the PoA?	DD PS	138	Yes, PP has developed a framework for implementation of the proposed PoA and inclusion of CPA’s under the POA using relevant formats and EB guidelines.	OK	OK
A.2.3 Is it confirmed that the proposed PoA is a voluntary action by the coordinating/managing entity?	DD PS	140	Yes, It is clearly mentioned in the PoA DD Section A.2 and validation team assessed the statement using local regulations and found that the claim made by CME is Correct. As per the Statement in PoA DD “There are no mandatory/regulatory requirements in Singapore to (a) install and operate more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings; or (b) installation and operation of more energy efficient lighting luminaires in new buildings. The proposed PoA is a voluntary action by the managing entity”	OK	OK
A.2.4 Is it explained how the PoA will reduce GHG emissions or increase GHG removals?	PS	31	Yes, CME has clearly mentioned that by installing energy efficient lights in building will reduce energy consumption which will result in reduction in GHG emissions.	OK	OK
A.2.5 Are sectoral scope(s) and type of the PoA indicated?	PS	31	Yes, Section B.3 of PoA DD provides information on the Sectoral Scope and type. CME has selected	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Scope No : 3 Sectoral scope : Energy Demand Category : AMS-II.C.: Demand-side energy efficiency activities for specific technologies Version : 14 Validity : 3 August 2012 onwards		
A.2.6 Is the contribution of PoA to sustainable development explained?	DD PS	31	Yes, Section A.2 of PoA DD Explains about sustainable development due to implementation of the proposed PoA.	OK	OK
A.3 CMEs and participants of PoA					
A.3.1 Is CME of the PoA identified, as the entity which communicates with the Board?	DD PS	141	Yes, UGL Services Premas Operations Limited will act as Coordinating Managing Entities ("CME") and project participant of this SSC-POA.	OK	OK
A.3.2 Are project participants to the PoA indicated?	DD PS	141	<i>CME will not be involved in any CPA implementation. CPA entities will be different.</i>	OK	OK
A.4 Party(ies)					
A.4.1 Are Party(ies) and CMEs involved in the proposed PoA listed in the table?	DD PS	141	Yes, Only Singapore is the identified party involved in the Proposed PoA.	OK	OK
A.4.2 Is contact information on entity/individual responsible for the PoA provided in Appendix 1?	DD		Yes	OK	OK
A.5 Physical/Geographical boundary of the PoA					



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
A.5.1 Are details of the defined boundary of the PoA provided, 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?	DD PS	142	Yes, Section A.5 of the PoA DD provided Information on physical / Geographical Areas. As per PoA DD Singapore is identified as geographical boundary for this PoA implementation and the PoA will encompass Buildings (Residential, Commercial and industrial) in Various town councils in Singapore. CPA may include one individual building or group of buildings.	OK	OK
A.5.2 In establishing the boundary, if the project participants have taken into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary?	VVS PS	192 142	Yes, PP has considered the National political division of Singapore. In Singapore Town Councils are considered as administration center for the allocated area.	OK	OK
A.6 Technologies/measures					
A.6.1 Are the technologies and/or measures to be employed and/or implemented by the CPAs in the PoA described, to enable the identification of the project's scale and type, demonstration of additionality, application of the selected methodology and calculations of GHG emission reductions or net GHG removals?	DD PS	147	Yes, <i>The PoA will include CPA's which will result in achievement of energy efficiency for Lighting Systems either by replacing existing inefficient Lighting systems by efficient Lighting System (LED Technology) or by implementing energy Efficient Lighting systems (LED Technology) in new Buildings.</i> The POA aims to implement energy efficient lighting technologies such as	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			Light Emitting Diodes (LEDs) and any other future energy efficient lighting options which are also eligible to be included under the POA. The luminaires, its associated electronic control gears (driver) and all accessories which will be installed with respect to each CPA, will be designed for reliable operations to light up the locations where they are installed. The luminaires will be able to fully withstand the current and voltage surges of lightning strikes and the frequent switching operation of the power supplies. The power requirement of the project luminaire system will be less than that of the replaced luminaires (in case of existing buildings).		
A.6.2 For the description, where relevant, are applicable provisions for application of selected baseline and monitoring methodology for small-scale project activities in the Project standard considered?	DD		YES	OK	OK
A.6.3 Are the technologies to be employed by the CPAs in the PoA described including a description of how environmentally safe and sound technology(ies) applied in the CPAs and know-how to be used are transferred to the host	PS	31	Yes, - Please Provide Clear information on Technical Specifications of LED lightings for Key	CL01	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
Party(ies)?			Parameters. (CL01) - Technical Specification TS Page 2 III b specifies Life time of L70 LED is 50000 Hours, however webhosted PDD mentions 500000 Hours CAR 1 - Please submit Manufactures specifications. (CAR 01)	CAR01	OK
A.7 Public funding of PoA					
A.7.1 Is it indicated whether the PoA receives public funding from Parties included in Annex I?	DD		Yes, CME has clearly mentioned that There is no Public funding or ODA available for this PoA.	OK	OK
A.7.2 In case where public funding from Annex I Parties is involved, are followings provided? (a) Information on Parties providing public funding (b) Attached in Appendix 2: the affirmation obtained from such Parties that such funding does not result in a diversion of official development assistance, is separate from, and is not counted towards the financial obligations of those Parties	DD PS	34	N/A, There is no Annex I party involve	NA	NA
B Demonstration of additionality and development					

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
of eligibility criteria					
B.1 Demonstration of additionality for PoA					
B.1.1 Is it described that how in the absence of CDM, none of the implemented CPAs would occur?	DD PoA- Stand	7	<p>Yes, CME has Demonstrated that in the absence of the CDM either: (i) the proposed voluntary measure would not be implemented, as there is no mandatory regulatory requirement in Host Country Singapore for achieving energy efficiency by installing energy efficient lighting system in buildings. This PoA is implemented to achieve energy efficiency and potential CDM revenue by selling CER's.</p> <p>PoA DD Section B.1 Para 3 Talks about "Availability of skill sets and equipment components with respect to these technologies is also expected to be limited. Hence, implementation of this PoA and avoidance of anthropogenic GHG emissions are additional to those that would have occurred in absence of this PoA. Availability of Skill Sets and Equipment components can not be the realistic barrier for the country like Singapore, hence The Additionality Argument is not acceptable. (CAR 2)</p>	<p>OK</p> <p>CAR 2</p>	<p>OK</p> <p>OK</p>



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.2 Eligibility criteria for inclusion of a CPA in the PoA					
B.2.1 Do the eligibility criteria cover the geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA?	PoA- Stand	14(a)	Yes, Eligibility Criteria include Geographical Boundary as one of the criteria. However there is no Time –induced Boundary is Applicable as the Grid emission Factor Considered as Ex Ante and is for only one Grid i.e. Singapore National Grid.	OK	OK
B.2.2 Do the eligibility criteria cover conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo)?	PoA- Stand	14(b)	Yes	OK	OK
B.2.3 Do the eligibility criteria cover the specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications?	PoA- Stand	14(c)	Technologies and measures is not correctly addressed, Please define what kind technologies CME will be using (Please provide Objective Criteria) (CAR 3)	CAR-3	OK
B.2.4 Do the eligibility criteria cover conditions to check the start date of the CPA through documentary evidence?	PoA- Stand	14(d)	Yes, However the Explanation on evaluating start date is not clear (Please refer to the Earlier Action date as the Start Date of CPA. With An Example for easy understanding) (CL 02)	CL02	OK
B.2.5 Do the eligibility criteria cover conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs?	PoA- Stand	14(e)	NO, There is no evidence to suggest that how CME has demonstrated that each of applicability condition prescribed by Approved methodology is complied under	CAR-4	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			eligibility criteria. A generic Statement on Applicability of AMS II.C is provided in the Applicability Criteria (CAR 4)		
B.2.6 Do the eligibility criteria cover the conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality as specified below:	PoA- Stand	14(f)	Definition of 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 (EB55 Annex38), however this information is not provided in the Web hosted PoA DD under Criteria No. 6.(CAR 5)	CAR-5	OK
B.2.6.1 PoAs that consist of one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of Guidelines on the demonstration of additionality of small – scale project activities” Version 09.0 (EB 68 Annex 27) .	PoA- Stand	9	<i>Refer to Table-2, provide assessment opinion on eligibility criteria pertaining to additionality</i>	OK	OK
B.2.6.2 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	PoA- Stand	11	Refer to Table-2, provide assessment opinion on eligibility criteria pertaining to additionality	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
embedded in the methodologies are met.					
B.2.6.3 For PoAs involving combinations of technologies /measures and/or methodologies, the eligibility criteria relative to each of them shall be proposed to demonstrate additionality.	PoA- Stand	12	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA
B.2.7 Do the eligibility criteria cover the PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis?	Eb65 Ann3	14(g)	Yes. CME has opt to perform Local Stake holder Consultation and Environmental Impact analysis is at CPA Level, Hence it is not applicable at PoA Level. CL03 Please provide under which legal requirement of NEA is allowing not to do EIA.	OK CL03	OK OK
B.2.8 Do the eligibility criteria cover conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance?	PoA- Stand	14(h)	Yes, CME will take undertaking from the CPA owners regarding the non-availability of public funding and ODA to the CPA.	OK	OK
B.2.9 Do the eligibility criteria cover, where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation)?	PoA- Stand	14(i)	There is no specific eligibility criteria established by CME to differentiate operating hours for lighting usage hours for residential, Commercial and industrial buildings and How it will ensure the constant load conditions are strictly	CAR-6	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			followed by each CPA (CAR 6)		
B.2.10 Do the eligibility criteria cover, 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?	PoA- Stand	14(j)	Eligibility Criteria does not include Sampling Requirements for baseline identification and monitoring requirements, Whereas CME has used the sapling method for carrying out the Baseline Energy consumption and monitoring requirements. (CAR 7)	CAR 7	OK
B.2.11 Do the eligibility criteria cover, where applicable, the conditions that ensure that every CPA in aggregate meets the small-scale threshold criteria and remains within those thresholds throughout the crediting period of the CPA?	PoA- Stand	14(k)	YES. CPA's are eligible if maximum energy savings does not exceed the threshold value 60 GWhr/year to justify the SSC limit	OK	OK
B.2.12 Do the eligibility criteria cover, where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) project categories?	PoA- Stand	14(l)	The eligibility criteria established in the webhosted PoA DD is not in accordance with EB 54 Annex 13. (CAR 8)	CAR 8	
B.2.13 Are the eligibility criteria verifiable?	PoA- Stand	15	Eligibility criteria does not include point i,j & k as mentioned in the Para 14 of latest EB guideline EB 65 Annex 03 also it does not include the baseline requirements as specified by the Approved methodology. (CAR 9)	CAR 9	
B.2.14 Are the eligibility criteria sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA?	PoA- Stand	16	Please Provide Objectivity in each eligibility Criteria as required by the EB Guideline (Please Refer Above CAR's (3 –	CAR 3- 9 CL 2 &	



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			9) and CLs 2 & 3)	3	
B.2.15 For PoAs that include combinations of technologies /measures and/or methodologies, are distinct eligibility criteria developed separately for each of the combinations?	PoA- Stand	20&27	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA
B.2.16 If a CPA uses technologies/measures from several methodologies, are the eligibility criteria derived from the requirements of all the methodologies?	PoA- Stand	27	<i>Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14</i>	NA	NA
B.3 Application of methodologies					
B.3.1 Are the technology/measures described and is the methodology chosen indicated?	DD		Yes, PoA will be using AMS II.C, Version 14 as an approved methodology for the Proposed PoA Project.	OK	OK
B.3.2 In cases where multiple technologies/measures or multiple methodologies are being applied, are all the combinations of technologies/measures and methodologies that will be used in the PoA listed?	DD PoA- Stand	26	<i>Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14</i>	NA	NA
B.3.3 If applicable, is a description of the sampling plan provided and is it demonstrated how it meets applicable provisions in the "Standard for sampling and surveys for CDM project activities and programme of activities"?	DD		The Sampling plan is applicable for the Baseline identification and Monitoring requirements only. The CME will use a simple random sampling plan to address monitoring requirements. In case value for certain parameters used for calculating project emissions and/or baseline emissions is	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>determined through sampling process, the size of the project sample group used for arriving at the value of such data parameter will be determined taking into consideration of the EB 65, Annex 2, version 2.0 "Standard for Sampling and Surveys for CDM project activities and Programme of Activities".e.g. A single sampling plan covering a group of CPAs referring to paragraph 19 of Sampling standard</p> <p>Please clarify whether the coordinating /managing entity does wish to have all CPAs verified or only sampled CPA's to be verified? The Description under Sampling plan should be in accordance with EB55 Annex 38.(CL 04)</p>	CL-04	OK
B.3.4 Has CME defined, where applicable, sampling plans for each of the combinations separately in accordance with the guidelines in section III. B of PoA Standard as well as any approved guidelines/standard from the Board pertaining to sampling and surveys?	PoA- Stand	27	The CME will use a simple random sampling plan to address monitoring requirements. In case value for certain parameters used for calculating project emissions and/or baseline emissions is determined through sampling process, the size of the project sample group used for arriving at the value of such data parameter will be determined	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			taking into consideration of the EB 65, Annex 2, version 2.0 "Standard for Sampling and Surveys for CDM project activities and Programme of Activities".e.g. A single sampling plan covering a group of CPAs referring to paragraph 19 of Sampling standard Please Refer CL04 above	CL04	
B.3.5 Where combinations of technologies/measures and/or methodologies are applied for a PoA, is it demonstrated that there are no cross effects between the technologies/measures applied?	PoA- Stand	28	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA
B.3.6 Where such cross effects do exist, has the CME proposed 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?	PoA- Stand	28	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA
B.3.7 Does the proposed PoA belong to the following eligible situations for applying combinations of technologies/measures and/or methodologies?	PoA- Stand	29			
B.3.7.1 The same combination of technologies/measures under the same combination of methodologies applied consistently in each and every CPA of a PoA	PoA- Stand	29 (a)	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.3.7.2 A single methodology is consistently applied in each CPA of a PoA but using multiple technologies/measures	PoA- Stand	29 (b)	Yes, PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	OK	OK
B.3.7.3 A principle technology/measure is applied consistently in each CPA using multiple combinations of methodologies	PoA- Stand	29 (c)	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14	NA	NA
B.3.7.4 Combinations of technologies/measures and methodologies vary across CPAs of a PoA.	PoA- Stand	29 (d)	Not Applicable and PoA will be using Only one Approved Methodology i.e. Type I Methodology i.e. AMS II.C Version 14.	NA	NA
B.3.7.5 In case of (B.3.7.4) above, has the CME demonstrated that the implementation of the activities is integrated through the design of the programme?	PoA- Stand	29 (d)	Not Applicable, Please Refer B.3.7.4	NA	NA
B.3.7.6 In case of (B.3.7.4) above, is it confirmed that the intended sectoral scopes and the combinations of methodologies intended for implementation are known ex ante, and no revisions of PoA documentation are foreseen for the duration of one crediting period, i.e. seven or 10 years of PoA implementation?	PoA- Stand	29 (d)	Not Applicable, Please Refer B.3.7.4	NA	NA
B.3.8 Has the CME optionally used the "Procedure for the submission and consideration of request for clarification on the application of approved small scale methodologies" (EB 34, annex 6) to seek clarifications on cross effects in the proposed combinations?	PoA- Stand	30	Not Applicable, Please Refer B.3.7.4	NA	NA



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.3.9 Is the compliance with the SSC threshold of a CPA met by following the "General Guidelines to SSC CDM methodologies"?	PoA- Stand	31	Yes, The threshold limit applicable for each CPA will be 60 GWh/Year. The aggregate energy savings by a single CPA will not exceed the 60 GWh/year.	OK	OK
C Management system					
C.1.1 Is a clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies provided?	PoA- Stand	17(a)	There is no Roles and responsibilities of personnel involved in the process of CPA inclusion including a review of their competencies is not provided in the Web hosted PoA DD. (CAR 10)	CAR 10	OK
C.1.2 Are records of arrangements for training and capacity development for personnel provided?	PoA- Stand	17(b)	Please Refer above CAR 10.	CAR 10	OK
C.1.3 Are procedures for technical review of inclusion of CPAs described?	PoA- Stand	17(c)	Please Refer above CAR 10.	CAR 10	OK
C.1.4 Is a procedure to avoid double counting described?	PoA- Stand	17(d)	Yes	OK	OK
C.1.5 Are records and documentation control process for each CPA under the PoA described?	PoA- Stand	17(e)	Please refer CAR 10 above	CAR 10	OK
C.1.6 Are measures for continuous improvements of the PoA management system described?	PoA- Stand	17(f)	Please refer CAR 10 above	CAR 10	OK
C.1.7 Is there any other relevant elements indicated?	PoA- Stand	17(g)	Please refer CAR 10 above	CAR 10	OK
D Duration of PoA					
D.1 Start date of PoA					



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
D.1.1 Is there a description of how the start date was determined?	DD		Yes. Foot note 5 is provided. CME has identified 14/08/2010 as the start date of the PoA, which is the date on PoA DD was initially webhosted for global stake holder consultation on UNFCCC Web site. http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/JQZC58SKAT6F8L9IZW5NCBKF21Z90Z/view.html	OK	OK
D.2 Length of the PoA					
D.2.1 Is the length of the PoA stated with a maximum total length of 28 years?	DD VVS	197	Yes, Length of the PoA is identified as 28 Years 0 Months	OK	OK
E Environmental impacts					
E.1 Level at which environmental analysis is undertaken					
E.1.1 Is it indicated whether the environmental analysis is performed at the PoA and/or the CPA level?	DD VVS PS	199 165	Yes, CME has indicated that the Environmental Analysis will be performed at CPA level.	OK	OK
E.1.2 Is the choice of level at which the environmental analysis is undertaken justified?	DD		Yes	OK	OK
E.2 Analysis of the environmental impacts					
E.2.1 Is a summary of the analysis of the environmental impacts and references to all related documentation in accordance with applicable provisions related to environmental impacts for PoAs in the Project Standard provided?	DD		NA, CME has justified that the Environmental Impact Analysis will be carried out at CPA level. However in Host country, Singapore Environmental impact Assessment for	OK	OK



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			Energy Efficiency Project is not required as per local environmental regulations.		
F Local stakeholder comments					
F.1 Solicitation of comments from local stakeholders	VVS	201			
F.1.1 Is it indicated whether the local stakeholder consultation process is performed at the PoA and/or the CPA level?	DD PS	166	Yes, Stake holder Consultation process will be performed at CPA Level .	OK	OK
F.1.2 Is the choice of level at which the local stakeholder consultation is undertaken justified?	DD		Yes	OK	OK
F.1.3 Is there a description of the process by which comments from local stakeholders were invited and compiled?	DD		Stake holder Consultation will be performed at CPA Level and the Process is clearly defined in the CPA DD.	OK	OK
F.2 Summary of comments received	VVS	201			
F.2.1 Are stakeholders that have made comments identified?	DD		Stake holder Consultation will be performed at CPA Level and the Process is clearly defined in the CPA DD.	OK	OK
F.2.2 Is a summary of these comments provided?	DD		Stake holder Consultation will be performed at CPA Level and the Process is clearly defined in the CPA DD.	OK	OK
F.3 Report on consideration of comments received	VVS	201			
F.3.1 Is information demonstrating that all comments received have been considered provided	DD		Stake holder Consultation will be performed at CPA Level and the Process is clearly	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS		Draft Concl	Final Concl
			defined in the CPA DD.			
G G. Approval and authorization						
G.1 General						
G.1.1 Is it indicated whether the letter(s) of approval from Party(ies) which wishes to be involved in the PoA, is available at the time of submitting the SSC-PoA-DD to the validating DOE?	DD		Yes, CME has provided information pertaining to the Approval in The PoA DD. The Letter of Approval from host country (Singapore) has been received on 22/11/2010 .		OK	OK
G.2 Approval			COUNTRY : Singapore	COUNTRY : NIL		
G.2.1 Has the coordinating/managing entity obtained a letter of approval from the DNA of each Party involved in the proposed PoA confirming that: (a) The Party is a Party of the Kyoto Protocol (b) Participation in the proposed PoA is voluntary (c) In case of the host Party, the proposed PoA assists the host Party in achieving sustainable development	VVS PS	39&51 169&170	Yes	N/A	OK	OK
G.2.2 Is(are) the letter(s) of approval unconditional with respect to (G.2.1) above?	VVS	40	Yes	N/A	OK	OK
G.2.3 Has(ve) the letter(s) of approval been issued by the respective Party's DNA? If there is doubt with respect to (G.2.1) above, was it verified with the DNA that the letter of approval is valid for the	VVS	41,42	Yes, DNA Approval is valid and found that	N/A	OK	OK



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proposed PoA under validation?			it was issued by National Environmental Agency.		
G.3 Authorization					
G.3.1 Has each project participant been authorized by at least one Party involved in a letter of approval?	VVS PS	45 172	The entity mentioned in the PoA DD Section A.4 is UGL Services Premas Operations Limited, However the DNA Approval provided by CME is for United Premas Ltd., Singapore. (CAR-11)	CAR 11	OK
G.3.2 Is the information in tabular form in the SSC-PoA-DD consistent with the contact information for project participants provided?	VVS	46	Yes	OK	OK
G.3.3 Are any entities other than those approved as project participants included in the SSC-PoA-DD?	VVS	47	<i>Not Applicable</i>	NA	NA
G.3.4 Has the approval of participation issued from the relevant DNA? And if in doubt, was it verified with the DNA that the approval of participation is valid for the proposed CDM project participants?	VVS	48	Refer CAR 11 above	CAR 11	OK
G.3.5 Has the coordinating/managing entity obtained letters of authorization of its coordination of the PoA from each host Party?	PS	171	Not Applicable as the PoA is limited to Geographical Boundary of Singapore only.	OK	OK
G.3.6 Is CDM project participation recorded only at the PoA level while the operators of individual CPAs are not required to be project participants?	PS	173	<i>Yes</i>	OK	OK



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Part II. Generic component project activity (CPA)			<i>Repeat all of Part II for each of the combination of technologies/measures and/or methodologies.</i>		
A General description of a generic CPA					
A.1 Purpose and general description of generic CPAs					
A.1.1 Is a description of each generic CPA within the PoA provided?	DD		Yes	OK	OK
B Application of a baseline and monitoring methodology					
B.1 Reference of the approved baseline and monitoring methodology(ies) selected					
B.1.1 Is exact reference (number, title, version) of the selected methodology or multiple methodologies indicated?	DD VVS PS	74 37	Yes. PP has selected one Approved methodology i.e. AMS II.C Demand-side energy efficiency activities for specific technologies, Version 14 and it is clearly mentioned in the Part II of PoA DD	OK	OK
B.1.2 Are there any tools and other methodologies to which the selected methodology refers?	DD VVS PS	74 37	<ul style="list-style-type: none"> - EB 63Report, Annex 19, Version 2.2.1"Tool to calculate the emission factor for an electricity system" - EB 65 Report, Annex 3, Version 01.0 "Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for 	OK	OK



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			<p>programme of activities”</p> <ul style="list-style-type: none"> - EB 65 Report, Annex 2, Version 2.0 “Standard for sampling and surveys for CDM project activities and Programme of Activities” - Guidelines on the demonstration of additionality of small – scale project activities” Version 09.0 (EB 68 Annex 27) - EB 54 Report, Annex 13, Version 3 “Guidelines on assessment of de-bundling for SSC project activities” 		
B.1.3 Is it confirmed that the selected methodology(ies) is(are) approved for application to CPAs under PoAs by the Board?	DD		Yes	OK	OK
B.2 Application of methodology(ies)					
B.2.1 Is the choice of the selected methodology(ies) justified by showing that each generic CPA meets each applicability condition of the methodology(ies)?	DD VVS PS	76 38	Yes, Refer to Table-2	OK	OK
B.2.2 If applicable, is a general description of the sampling plan provided?	DD		Yes	OK	OK
B.2.3 Is it demonstrated that the CPA qualifies as Type I, II, and/or III during every year of the crediting period in accordance with applicable provisions	DD PS	81-84	Yes, CME has included to the condition pertaining to the Applicability under Type I,II and III. The Project Activity will be	OK	OK



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for project activity eligibility in the Project standard?			Type II: Energy efficiency improvement project activities that reduce energy consumption, on the supply and/or demand side, with a maximum output of 60 GWh per year (or an appropriate equivalent) in any year of the crediting period; or		
B.2.4 Is documentation that has been used as a basis of justification explained or include in Appendix 3? Are references provided?	DD		YES	OK	OK
B.3 Sources and GHGs					
B.3.1 Are the sources and GHGs included in each generic CPA boundary described?	DD VVS PS	82 39	Yes. The Source of GHG emission is Power Plants serving the electricity grid of Singapore and hence CME has identified CO2 as the major GHG Gas contributing to Emissions in the proposed project activity. This is acceptable as the Project activity only involves conservation of Electrical energy.	OK	OK
B.3.2 In cases where the selected methodology(ies) allows project participants to choose whether a source or gas is to be included in the CPA boundary, is the choice explained and justified?	VVS PS	84 40	Yes, there is no other gases involve in the project activity and project boundary identification is found satisfactorily done,	OK	OK
B.3.3 Where possible, is a flow diagram physically delineating each generic CPA presented?	DD		<i>Yes, Please Refer A.6.1 above</i>	OK	OK
B.3.4 Are all the equipment, systems and flows of mass	DD		Yes	OK	OK



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and energy included in the flow diagram?					
B.3.5 Are emissions sources and GHGs which included in the project boundary and the data and parameters to be monitored indicated in the diagram?	DD		Yes	OK	OK
B.4 Description of baseline scenario					
B.4.1 Is it described how the baseline scenario is identified for each generic CPA?	DD		<p>Yes, CME has applied the Baseline Scenario as per the approved methodology Para</p> <p>As per the methodology AMS II.C./version 14, the determination of energy baseline depends on whether the energy displaced is fossil fuel or electricity. The CPAs under this PoA will either involve</p> <p>(a) installation and operation of more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings; or</p> <p>(b) Installation and operation of more energy efficient lighting luminaires in new buildings; located in distinct geographical locations across Singapore. The geographical location of each CPA implemented under this PoA will be unambiguously identifiable and</p>	OK	OK



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			verifiable. The energy displaced in the baseline will be electricity and not fossil fuel. In case a CPA involves installation and operation of more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings, the baseline scenario will be the electricity consumption of the existing luminaire technology installed in such buildings.		
B.4.2 Is it explained how the baseline scenario is established in accordance with the selected methodology(ies) and applicable provisions for establishment and description of baseline scenarios in the Project standard?	DD VVS PS	88 41	<i>Refer to Table-2</i> Yes, CME has applied the Baseline Scenario as per the approved methodology Para As per the methodology AMS II.C./version 14, the determination of energy baseline depends on whether the energy displaced is fossil fuel or electricity. The CPAs under this PoA will either involve (a) installation and operation of more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings; or (b) installation and operation of more	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			<p>energy efficient lighting luminaires in new buildings; located in distinct geographical locations across Singapore. The geographical location of each CPA implemented under this PoA will be unambiguously identifiable and verifiable. The energy displaced in the baseline will be electricity and not fossil fuel.</p> <p>In case a CPA involves installation and operation of more energy efficient lighting luminaires in replacement to existing luminaires in existing buildings, the baseline scenario will be the electricity consumption of the existing luminaire technology installed in such buildings.</p>		
B.4.3 Do the project participants follow the “Guidelines on the consideration of suppressed demand in CDM methodologies” when establishing the baseline scenario, where future anthropogenic emissions by sources are projected to rise above current levels due to the specific circumstances of the host Party?	PS	42	<p><i>Refer to Table-2. The Baseline scenario is established as per the Approved Methodology and there is condition where future anthropogenic emission by sources will rise above current levels due to specific circumstances of the host party. CME has considered electricity consumption as the baseline and emission reductions are achieved by improving energy efficiency of Lighting system.</i></p>	OK	OK
B.4.4 Do the project participants take into account	VVS	93	<i>There is no E+ / E- policies applicable in</i>	OK	OK



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national and/or sectoral policies including E+/E-policies when establishing the baseline scenario?	PS	43-45	<i>Singapore, which governs Energy efficiency in Lighting systems.</i>		
B.4.5 Where the procedure in the selected methodology (ies) involves several steps, is it described how each step is applied and is the outcome of each step transparently documented?	DD		Please refer B.4.4 above.	OK	OK
B.4.6 Are key assumptions and rationales explained and justified?	DD		Yes, Key rationals and assumptions for determining Baseline scenario is explained and justified.	OK	OK
B.4.7 Are all data used to establish the baseline scenario (variables, parameters, data sources, etc.) provided and explained?	DD		Yes	OK	OK
B.4.8 Are all relevant documentation and/or references provided?	DD		Yes	OK	OK
B.4.9 Is a transparent description of the baseline scenario provided?	DD VVS PS	92 46	<i>The full description of the technology of the baseline scenario is provided in section A.6 of Part I by the CME</i>	OK	OK
B.5 Demonstration of eligibility for a generic CPA					
B.5.1 Is it demonstrated how each generic CPA meets the eligibility criteria of the PoA including confirmation of additionality of the generic CPA for its inclusion into the PoA?	DD		Yes, CME has established eligibility criteria and it is demonstrated how each eligibility criteria will be assessed against each CPA at the time inclusion to the PoA.	OK	OK
B.6 Estimation of emission reductions of a generic CPA					



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B.6.1 Explanation of methodological choices					
B.6.1.1 Is it explained how the methods or methodological steps, in the selected methodology, for calculating baseline emissions, project emissions, leakage emissions and emission reductions are applied to each generic CPA?	DD VVS PS	97 51	<i>Refer to Table-2</i>		
B.6.1.2 Is it clearly stated which equations will be used in calculating emission reductions?	DD VVS PS	97 50-51	Yes. CME has provided Three options for determining the Baseline emissions as per the requirement of Approved methodology and it is also found that PP has applied equations for calculating Baseline emissions and emission reduction correctly.	OK	OK
B.6.2 Data and parameters that are to be reported ex-ante					
B.6.2.1 Is a compilation of information on the data and parameters that are not monitored during the crediting period but are determined before the validation and remain fixed throughout the crediting period included?	DD VVS PS	98 52	Yes. CME has identified various ex ante parameters which will not be monitored and will remain constant through the crediting period. These parameters are listed in the Section B.6.2 of Part II <ul style="list-style-type: none"> - Combined margin emission factor in year y - Average annual technical grid losses - Project Sample group (PSG) 	OK	OK



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			<ul style="list-style-type: none"> - Sample group of non-metered buildings - Number of devices of the group of “i” devices replaced - Number of newly installed energy efficient luminaires - Power of the devices of the group of “i” baseline devices - 		
B.6.2.2 Is it ensured that data that become available only after the registration/inclusion of the CPAs in the PoA (e.g. measurements after the implementation of the CPAs in the PoA) should not be included here but in the table in section B.7?	DD		Yes	OK	OK
B.6.2.3 The compilation of information may include data that are measured or sampled, and data that are collected from other sources (e.g. official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.), is the compilation in compliance with this?	DD		Yes	OK	OK
B.6.2.4 Data that are calculated with equations provided in the selected methodology(ies) or	DD		Yes	OK	OK



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default values specified in the methodology(ies) should not be included in the compilation, is the compilation in compliance with this?					
B.6.2.5 For each piece of data or parameter, is the table in SSC-PoA-DD completed, following these instructions below:					
B.6.2.5.1 "Value(s) applied": Provide the value applied. Where a time series of data is used, where several measurements are undertaken or where surveys have been conducted, provide detailed information in Appendix 4. To report multiple values referring to the same data or parameter, use one table. If necessary, reference(s) to electronic spreadsheets may be used	DD		There is no survey done, however baseline monitoring (Pre-project) is made available separately in the Excel spread sheet where electrical consumption of baseline luminaries for one month is provided during validation.	OK	OK
B.6.2.5.2 "Choice of data": Indicate and justify the choice of data source. Provide clear and valid references and, where applicable, additional documentation in Appendix 4	DD		Yes	OK	OK
B.6.2.5.3 "Measurement methods and procedures": Where values are based on measurement, include a description of the measurement methods and procedures applied (e.g. which standards have been used), indicate the responsible person/entity that undertook the measurement, the date of the	DD		Yes	OK	OK



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measurement and the measurement results. More detailed information can be provided in Appendix 4					
B.6.2.5.4 "Purpose of data": Choose one of the following: (i) Calculation of baseline emissions; (ii) Calculation of project emissions; (iii) Calculation of leakage	DD		Yes	Ok	Ok
B.6.3 Ex-ante calculations of emission reductions					
B.6.3.1 Is a transparent ex ante calculation of project emissions, baseline emissions(or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant equations provided in the selected methodology provided?	DD		Yes, The information is provided in the tabular form and CME has used correct Formulae as prescribed by the Approved methodology AMS IIC, Version 14 and is found correctly applicable. CME has also provided transparent spread sheet for determining these parameters.	Ok	OK
B.6.3.2 For data or parameters available before validation, are values contained in the table in section B.6.2 of SSC-PoA-DD used?	DD		Yes	OK	OK
B.6.3.3 For data/parameters not available before validation and monitored during the crediting period, are estimates for parameters contained in the table in section B.7.1 of SSC- PoA-DD used?	DD		Yes	OK	OK
B.6.3.4 If any of these estimates has been determined by a sampling approach, is a	DD		CME has used Sampling approach to determine monitoring of the blocks.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
description of the sampling efforts provided in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities"?			CME has utilized a simple random sampling plan to address monitoring requirements. In case value for certain parameters used for calculating project emissions and/or baseline emissions is determined through sampling process, the size of the project sample group used for arriving at the value of such data parameter will be determined taking into consideration of the EB 65, Annex 2, version 2.0 "Standard for Sampling and Surveys for CDM project activities and Programme of Activities".		
B.6.3.5 Is it documented how each equation is applied, in a manner that enables the reader to reproduce the calculation?	DD		Yes	OK	OK
B.6.3.6 Where relevant, are additional background information and/or data in Appendix 4, including relevant electronic spreadsheets provided?	DD		Yes	OK	OK
B.6.3.7 Is a sample calculation for each equation used provided, substituting the values used in the equations?	DD		Yes	OK	OK
B.7 Application of the monitoring methodology and description of the monitoring plan					
B.7.1 Data and parameters to be monitored by each					



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
generic CPA					
B.7.1.1 Is specific information on how the data and parameters that need to be monitored would actually be collected during monitoring included?	DD		Yes	OK	OK
B.7.1.2 In case of data that are determined only once for the crediting period but that will become available only after registration/inclusion of the CPAs in the PoA, are they included here?	DD		Yes <i>measurements after the implementation of the CPAs in the PoA i.e. number of Luminaries Replaced, Energy consumption etc</i>	OK	OK
B.7.1.3 For each piece of data or parameter, is the table in SSC-PoA-DD completed, following these instructions below:	DD				
B.7.1.3.1 "Source of data": Indicate the source(s) of data that will be used for the CPAs in the PoA (e.g. which exact national statistics). Where several sources may be used, justify which data sources should be preferred	DD		Yes	OK	OK
B.7.1.3.2 "Value(s) applied": The value applied is an estimate of the data/parameter that will be monitored during the crediting period, but is used for the purpose of calculating estimated emission reductions. To report multiple values referring to the same data or parameter, use one table. If necessary, reference(s) to electronic spreadsheets may be used	DD		Yes,	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.7.1.3.3 "Measurement methods and procedures": Where data or parameters are to be monitored, specify the measurement methods and procedures, standards to be applied, accuracy of the measurements, person/entity responsible for the measurements, and, in case of periodic measurements, the measurement intervals	DD		Yes	OK	OK
B.7.1.3.4 "QA/QC procedures": Describe the Quality Assurance (QA)/Quality Control (QC) procedures to be applied, including the calibration procedures, where applicable	DD		Yes	OK	OK
B.7.1.3.5 "Purpose of data": Choose one of the following: (i) Calculation of baseline emissions; (ii) Calculation of project emissions; (iii) Calculation of leakage.	DD		Yes	OK	OK
B.7.1.4 Is there any relevant further background documentation provided in Appendix 5?	DD		Yes, CME has provided information related to Data Archiving Procedure.	OK	OK
B.7.2 Description of the monitoring plan for a generic CPA					
B.7.2.1 Is the monitoring plan for a generic CPA developed in accordance with the approved monitoring methodology(ies), including applicable tool(s)?	DD VVS PS	198 156	<i>Refer to Table-2</i>	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.7.2.2 If data and parameters monitored in section B.7.1 of the SSC-PoA-DD are determined by a sampling approach, is a description of the sampling plan provided in accordance with the recommended outline for a sampling plan in the "Standard for sampling and surveys for CDM project activities and programme of activities"?	DD PS	53	Yes	OK	OK
B.7.2.3 Is there any relevant further background information provided in Appendix 5?	DD		Yes, CME has provided information related to Data Archiving Procedure.	OK	OK
Part III Others					
A Appendix					
A.1 Appendix 1: Contact information on entity/individual responsible for the PoA					
A.1.1 For each organization listed in section A.4 of the SSC-PoA-DD, is the table in SSC-PoA-DD completed, with the following mandatory fields: Organization, Street/P.O. Box, City, Postcode, Country, Telephone, Fax and E-mail, and Name of contact person?	DD		Yes	OK	OK
A.2 Appendix 2: Affirmation regarding public funding					
A.2.1 If applicable, is the affirmation obtained from Parties included in Annex I providing public funding to the PoA attached?	DD		Yes, There is no public funding involved in the project activity.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
A.3 Appendix 3: Application of methodology(ies)					
A.3.1 Is there any further background information on the applicability of the selected methodology(ies) provided?	DD		NA	NA	NA
A.4 Appendix 4: Further background information on ex ante calculation of emission reductions					
A.4.1 Is there any further background information on the ex-ante calculation of emission reductions provided? This may include data, measurement results, data sources, etc.	DD		NA	NA	NA
A.5 Appendix 5: Further background information on the monitoring plan					
A.5.1 Is there any further background information used in the development of the monitoring plan? This may include tables with time series data, additional documentation of measurement equipment, procedures etc.	DD		Yes, CME has provided information related to Data Archiving Procedure.	OK	OK
B Global Stakeholder Consultation					
B.1.1 Is there any comment on the SSC-PoA-DD of the proposed project activity received during Global Stakeholder Consultation process?	VVS	34	No	NA	NA
B.1.2 If yes, have all comments been taken into account during the validation of the proposed project activity?	VVS	35	NA	NA	NA



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
B.1.3 If comments indicate that the proposed project activity does not comply with the CDM requirements and are not substantiated, is there any further clarification from the entity providing the comment?	VVS	36	N.A	NA	NA
B.1.4 If yes, how comments received have been taken due account?	VVS	36	NA	NA	NA
B.1.5 If no, are the comments as originally provided proceeded to assess?	VVS	36	NA	NA	NA
C Modalities of Communications (MoC)					
C.1.1 Has the corporate identity of all project participants and focal points included in MoC statement, as well as the personal identities, including specimen signatures and employment status, of their authorized signatories been validated by:	VVS	53	Yes CME has provided MOC document including names of Focal Points and names of Focal points are 1. Panchaksharam Thirumalavam 2. Ng Koon Siang Both focal points are representing single entity i.e. UGL Services Premas Operations Limited	OK	OK
C.1.1.1 Directly checking evidence for corporate, personal identity and other relevant documentation; or	VVS	54(a)	Validation team has checked evidences for corporate person identity using - Certification Letter from HR Department confirming Employment and Specimen signature of Focal Points - Passport Details	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
C.1.1.2 Notarized documentation; or	VVS	54(b)	Not Applicable	NA	NA
C.1.1.3 Written confirmation from the project participant or the coordinating/managing entity that all corporate and personal details, including specimen signatures, are valid and accurate.	VVS	54(c)	Yes, Validation team has checked evidences for corporate person identity using - Certification Letter from HR Department confirming Employment and Specimen signature of Focal Points Passport Details	OK	OK
C.1.2 If (C.1.1.3) above was chosen, is it ensured that the MoC statement is received from the Coordinating/ managing entity?	VVS	55	Yes, Validation team has received the MOC statement directly from CME i.e UGL Services Premas Operations Limited.	OK	OK
C.1.3 If (C.1.1.3) above was chosen, is it ensured that the official who submits the MoC statement to the DOE and the official who signed the written confirmation (if a different person) is/are duly authorized to do so on behalf of the respective project participant?	VVS	56	Yes, Mr, Panchaksharam Thiruvalam is the authorized person to coordinate such activities on behalf of the CME	OK	OK
C.1.4 If it is unable to validate the requirements by applying C.1.1.1 to C.1.1.3 above, are any further validation activities performed?	VVS	57	Not Applicable	NA	NA
C.1.5 Has the latest version of the form "Modalities of Communication statement" (F-CDM-MOC) been used?	VVS PS	60(a) 72	Yes, Latest version of the form is been used.	OK	OK
C.1.6 Is the information required as per F-CDM-MOC, including its annex 1, correctly completed?	VVS PS	60(b) 72	Yes	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
C.1.7 Do the project participant's authorized signatories signing the F-CDM-MOC correspond to the project participant's authorized signatories included in F-CDM-MOC, annex 1?	VVS PS	60(c) 174	Yes	Ok	OK
C.1.8 Is it confirmed that the CME is either the sole or a joint focal point for each scope of authority?	PCP	29	CME is the sole focal Point for this PoA	OK	OK
C.1.9 Is it confirmed that the number of joint focal points is limited to five, or equal to the number of host parties if greater than five?	PCP	29	Not Applicable as the there is only one entity is involved in the PoA i.e. UGL Services Premas Operation Limited.	NA	NA



TABLE 2 :RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1 and 2	Summary of project owner response	Validation team conclusion
<u>Clarifications (CL) at PoA Level</u>			
Please Provide Clear information on Technical Specifications of LED lightings for Key Parameters. (CL01)		General technical measures are described under the section A.6 (Part I). Detailed technical specifications are described at CPA level. However, we have included the following technical spec under section A.6 (Part I): "LED light equipments will have a configuration of control gear with minimum efficiency of 75% and power factor of greater than or equal to 0.9"	Corrections in PoA DD are verified and found satisfactory hence CL 01 is closed.



VALIDATION REPORT

<p>The Explanation on evaluating start date is not clear (Please refer to the Earlier Action date as the Start Date of CPA. With An Example for easy understanding) (CL 02)</p>		<p>The evaluation of start date of CPA is clearly explained under section B.2 (Part I) as follows:</p> <p>“The start date of the CPA shall be established as the date of agreement signed between the LED supplier/contractor and project owner</p> <p>Supporting document: Agreement between the project owner and supplier/contractor”</p>	<p>Description on start date of PoA and CPA is now explained clearly in PoA DD and found correct , hence CL02 is closed.</p>
<p>Please explain under which legal requirement of NEA it is allowed to exclude Energy efficiency projects from EIA.(CL 03)</p>		<p>The reference link is provided under point 7 in section B.2 (Part I).</p> <p>The legal requirement named “CENTRAL BUILDING PLAN DEPARTMENT GUIDELINES FOR POLLUTION CONTROL (PC) STUDY” released by National Environment Agency (NEA) of Singapore does not impose any legal requirement to carry out EIA for energy efficiency projects in buildings.</p> <p>The details included under section B.2 (Part I) in the PoA-DD as follows:</p> <p>The EIA is not required for the lighting projects in Singapore. Reference: http://app2.nea.gov.sg/data/cmsresource/20120209553102984609.pdf</p>	<p>Reviewed the Guideline by Central Building plan department of Singapore , hence it is confirmed that there is no requirement of performing environmental impact assessment for the energy efficiency projects to be implemented in Singapore, hence CL 03 is closed.</p>



VALIDATION REPORT

Please clarify whether the coordinating /managing entity does wish to have all CPAs verified or only sampled CPA's to be verified? The Description under Sampling plan should be in accordance with EB55 Annex 38.(CL 04)		CME prefers to perform verification of each individual CPA. Hence, there is no sampling plan for CPA verification established.	
Corrective Action Requests (CAR) at PoA Level			
Technical Specification TS Page 2 III b specifies Life time of L70 LED is 50000 Hours, however webhosted PDD mentions 500000 Hours CAR 1 - Please submit Manufactures specifications. (CAR 01)		<p>The technical lifetime of LED luminaires is 50,000 hours. The test report of LED luminaires to be provided to justify the technical lifetime of LED luminaires.</p> <p>Document reference: Notification of test results of luminaires for compliance test with HDB/EM services technical specifications for general 2 feet LED luminaires and recessed LED luminaires</p> <p>Test results issued by the TUV-SUB PSB Singapore.</p>	Verified the evidence provided by CME and found that the claim of 50000 Hrs. of lifetime for LED lights is correct and hence CAR 01 is closed.
PoA DD Section B.1 Para 3 Talks about "Availability of skill sets and equipment components with respect to these technologies is also expected to be limited. Hence, implementation of this PoA and avoidance of anthropogenic GHG emissions are additional to those that would have occurred in absence of this PoA. Availability of Skill Sets and Equipment components cannot be the realistic barrier for the country like Singapore, hence The Additionality Argument is not acceptable. (CAR 2)		The sentence "Availability of skill sets and equipment components with respect to these technologies is also expected to be limited" is removed from the PoA-DD from section B.1 (Part I).	Revised PoA DD section B.1 is now found correct and hence CAR 02 is closed.



VALIDATION REPORT

Technologies and measures is not correctly addressed, Please define what kind of technologies CME will be using (Please provide Objective Criteria) (CAR 3)		<p>The technologies and measures is included under section B.2 (Part I) as follows:</p> <p>Technologies and Measures: The LED disseminated are high efficiency lighting with a specified electronic control gear efficiency of at least 75%</p>	CME has revised PoA DD Section B.2 and revised information pertaining to the technology and measures of LED lights found correct hence CAR 3 is closed.
There is no evidence to suggest that how CME has demonstrated that each of applicability condition prescribed by Approved methodology is complied under eligibility criteria. A generic Statement on Applicability of AMS II.C is provided in the Applicability Criteria (CAR 4)		<p>The CME has included all supporting documents need to be provided for the each applicability criteria described as per the approved methodology AMS-II.C.</p> <p>Refer section B.2 of Part I and Part II</p>	Revised PoA DD is now includes clear objective evidences for demonstrating Applicability conditions as prescribed in the Methodology AMS IIC, Version 14, hence CAR 4 is closed.



VALIDATION REPORT

<p>Definition of 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 (EB55 Annex38), however this information is not provided in the Web hosted PoA DD under Criteria No. 6.(CAR 5)</p>	<p>The following eligibility criteria regarding the additionality applicability in the revised PoA-DD as follows:</p> <p>Eligibility Criteria:</p> <p>The CPA is additional as demonstrated in the additionality criteria in section B.5 of Part II.</p> <ul style="list-style-type: none"> • If the first approach is chosen, the micro scale eligibility has to be justified. • If the second approach is chosen, one of the small scale additionality criteria has to be met. <p>Confirmation by CPA:</p> <p>CPA-DD to justify the Additionality using guidance provided in PoA-DD.</p> <p>Any of the below supporting documents shall be provided (iii) for first approach</p> <ol style="list-style-type: none"> 4 evidence of country status 5 certified rating tests 6 Relevant information in SSC-CPA-DD following the relevant Guidelines for Demonstrating Additionality of Micro scale Project Activities (Version 03). <p>(iv) for second approach</p> <ol style="list-style-type: none"> a. production cost spreadsheet for financial barrier b. technological description and risk analysis c. Relevant information in SSC-CPA-DD following the additionality approaches set out in the PoA-DD. <p>Relevant information in SSC-CPA-DD following the additionality approaches set out in the PoA-DD.</p>	<p>Revised eligibility criteria regarding additionality is now found correct and hence CAR 5 is closed.</p>
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VALIDATION REPORT

There is no specific eligibility criteria established by CME to differentiate operating hours for lighting usage hours for residential, Commercial and industrial buildings and How it will ensure the constant load conditions are strictly followed by each CPA (CAR 6)		<p>The operating hours are not constant for all CPAs and therefore no such criteria included under the eligibility criteria of PoA-DD.</p> <p>The operating hours of luminaires is a monitoring criterion as per the approved methodology. It may vary for each CPA. Therefore, the operating hours will be explained at CPA level.</p>	Justification provided by the CME is found correct and hence CAR 6 is closed.
Eligibility Criteria does not include Sampling Requirements for baseline identification and monitoring requirements, Whereas CME has used the sapling method for carrying out the Baseline Energy consumption and monitoring requirements. (CAR 7)		<p>The sampling requirement is included under the section B.3 (Part I) as follows:</p> <p>Sampling Method CME prefers to perform verification of each individual CPA. Hence, there is no sampling plan for CPA verification established.</p> <p>The CME will use a simple random sampling plan to address monitoring requirements. In case value for certain parameters used for calculating project emissions and/or baseline emissions is determined through sampling process, the size of the project sample group used for arriving at the value of such data parameter will be determined taking into consideration of the EB 65, Annex 2, version 2.0 "Standard for Sampling and Surveys for CDM project activities and Programme of Activities".</p>	Revised PoA DD is now include the eligibility criteria for sampling requirement and the description is is found correct hence CAR 7 is closed.



VALIDATION REPORT

The eligibility criteria established in the webhosted PoA DD is not in accordance with EB 54 Annex 13 to demonstrate how CPA will be assessed against Debundling criteria. (CAR 8)		In revised PoA-DD, the eligibility criteria is revised as per EB 54, Annex 13	Revised PoA DD now includes all eligibility criteria as specified in EB 54 annex 13 for demonstrating Debundling criteria. Hence CAR 8 is closed.
Eligibility criteria does not include point i,j & k as mentioned in the Para 14 of latest EB guideline EB 65 Annex 03 also it does not include the baseline requirements as specified by the Approved methodology. (CAR 9)		In accordance with EB 65 Annex 03, the points 12, 13 and 14 are included under the eligibility criteria table, section B.2 (Part I and Part II).	Revised PoA DD now includes all specified eligibility criteria in EB 65 Annex 3
There is no Roles and responsibilities of personnel involved in the process of CPA inclusion including a review of their competencies is not provided in the Web hosted PoA DD. (CAR 10)		The roles and responsibilities of personal involved in monitoring of CPA is included under section B.7.2 in the revised PoA-DD.	Revised PoA DD section B.7.2 now includes Roles and responsibilities of persons involved in the PoA implementation and hence CAR 10 is closed.



VALIDATION REPORT

The entity mentioned in the PoA DD Section A.4 is UGL Services Premas Operations Limited, However the DNA Approval provided by CME is for United Premas Ltd., Singapore. (CAR-11)		The NEA has been issued another letter to state the name change of CME.	Validation team reviewed the letter issued by NEA (DNA of Singapore) and found correct, hence CAR 11 is closed.
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