



POA VALIDATION REPORT

ETA Solar Water Heater Programme in South Africa

25 July 2012

Japan Consulting Institute

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CDM Validation Report for ETA Solar Water Heater Programme in South Africa

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Confirmed by Akio Yoshida, Executive Director	Organizational Unit JCI CDM Centre, Japan Consulting Institute (JCI)
Client CEF Solar Water Heater Programme in South Africa	Client ref., Mr. Jabulani Shabalala
Project name	ETA Solar Water Heater Programme in South Africa
Host Country Republic of South Africa	Methodology version AMS-I.J. (Version 1.0)
Size Small Scale	ER estimate 20,370 t-CO ₂ e/year (for CPA001 average)

A summary of the validation process and its conclusions, validation opinion

Japan Consulting Institute (JCI) has performed a validation work of the small-scale CDM Program of Activities (PoA) with the title "ETA Solar Water Heater Programme in South Africa" in the Republic of South Africa (hereafter called the PoA). This report summarises the findings of the validation of the PoA design document (CDM-SSC-PoA-DD) together with generic information relevant to all CDM programme activities (CPAs) and the specific CDM-SSC-CPA-DD which is based on the application of the PoA to the CPA001 as the first real case to be included in this PoA.

The validation has been performed on the basis of UNFCCC criteria for PoA under the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

- The review of the SSC-PoA-DD, the generic SSC-CPA-DD and SSC-CPA-DD for the real case (CPA001) (hereafter referred to "DDs") and the subsequent follow-up interviews have provided JCI with evidences to determine the fulfilment of stated criteria.
- The host country is the Republic of South Africa and the Annex I country is Finland.
- The project applies "AMS-I.J Renewable energy projects –Solar water heating system (SWH) (version 1.0)", and referenced Tool.
- The total emission reductions from the project are estimated to be on the average 20,370 t-CO₂e per year over the 10 years crediting period for CPA001.
- It is JCI's opinion that the PoA as described in the CDM-SSC-PoA-DD version 5 of "23/07/2012", CDM-SSC-CPA-DD version 5 of "23/07/2012" and generic CDM-SSC-CPA-DD meet relevant UNFCCC requirements for the PoA and relevant host country criteria and correctly applies the methodology ASM-I.J version 1.0

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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CL	Clarification Request
CDM	Clean Development Mechanism
CEF	Carbon Energy Fund
CERs	Certified Emission Reductions
CM	Combined Margin
CME	Coordinating and Managing Entity
CO ₂	Carbon dioxide
CPA	CDM Programme Activity
DD	Design Document
DOE	Designated Operation Entity
DNA	Designated National Authority
ERPA	Emission Reduction Purchase Agreement
ERs	Emissions Reductions
EB	Executive Board
ESKOM	Electricity Supply K(C)ommission
ETA	ETA Energy
GHG	Greenhouse Gas
IG	Innovation Group
JCI	Japan Consulting Institute
KP	Kyoto Protocol
LoA	Letter of Approval
OM	Operating Margin
PP	Project Participant
SABS	South Africa Bureau of Standard
SWH	Solar Water Heater
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Clean Development Mechanism Validation and Verification Manual Ver. 01.2

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Appendix A: Validation Protocol

Appendix B: Certificate of Appointment of Validation Team

I. VALIDATION SUMMARY AND OPINION

Japan Consulting Institute (JCI) has performed a validation of the ETA Solar Water Heater Programme in South Africa. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The reviews of the design documentation and the subsequent follow-up interviews have provided JCI with evidences to determine the fulfillment of stated criteria.

The host country is Republic of South Africa and the Annex I country is Finland. Both countries fulfill the participation criteria.

The project applies “AMS-IJ/41/ Solar water heating systems (SWH)”, version 1.0 as applied methodology.

The total emission reductions from the first CPA (CPA001) under the proposed PoA are estimated to be on the average 20,370 tCO₂e per year over the 10 year crediting period. The estimated emission reduction has been checked based on the validation work and JCI considers all relevant assumptions for the above estimated emission reduction is appropriate.

In summary, it is JCI’s validation conclusion that the PoA as described in the latest version of DDs which include the generic CPA-DD and specific real case CPA-DD (CPA001), and meets all relevant UNFCCC requirements for PoA and all relevant host country criteria and currently applies the baseline and monitoring methodology AMS-IJ/41/ “Solar water heating systems (SWH)” (version 1.0).

JCI thus provides a positive validation opinion and the requests for the registration of the proposed project as a PoA.

II. INTRODUCTION OF POA VALIDATION

ETA Solar Water Heater Programme in South Africa has commissioned JCI to perform a validation of the PoA. This report summarizes the findings of the validation of the PoA performed on the basis of CDM VVM version 01.2, and related UNFCCC criteria and requirements for the PoA, 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 modalities and procedures and the subsequent decisions by the CDM Executive Board.

1. Objective of CDM Validation

The purpose of validation is to ensure a thorough, independent assessment of proposed project activities submitted for registration as a proposed PoA project activity against the applicable PoA requirements.

JCI reports the results of its assessment in a validation report. JCI submits this validation report, along with the supporting documents to the CDM Executive Board as part of the request for registration of PoA.

This validation report includes a positive validation opinion as the proposed activity complies with the applicable PoA requirements.

2. Validation approach

The CDM is a rules-based mechanism. Therefore, it is the JCI's responsibility to ensure that, in accordance with the Validation and Verification Manual version 01.2/40/ and PoA requirements, these rules are complied with for any project activities requesting registration as a proposed PoA project activity.

During validation, the JCI assesses whether the project design of the proposed PoA project activity meets the all relevant requirements. For this, JCI, using objective evidence, assesses the completeness and accuracy of the claims and conservativeness of the assumptions made in the design documents (DDs) of the PoA. The evidence used in this assessment is not limited to that provided by the Coordinating/Managing Entity (CME: ETA Energy).

In assessing evidence, JCI does not omit evidence that is likely to alter the validation opinion. In the assessment of evidences, JCI uses the acceptable approaches as specified in section II to IV, below, and JCI ensures that the project activity complies with the relevant requirements set out in the CDM modalities and procedures, the applicability conditions of the selected methodology and guidance issued by the CDM Executive Board before submitting a request for registration.

In case the validation report includes a negative validation opinion, the validation report is sent to the CDM Executive Board.

3. VALIDATION METHODS

3.1 Means of validation

JCI applies standard auditing techniques to assess the correctness of the information provided by the project participants, including, where appropriate, but not limited to:

- (a) Document review, involving:
 - (i) Review of data and information to verify the correctness, credibility and interpretation of presented information;

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- (ii) Cross checks between information provided in the DDs and information from sources other than that used, if available, and if necessary independent background investigations
- (b) Follow-up actions (e.g., on site visit and telephone or email interviews), including:
 - (i) Interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation;
 - (ii) Cross-check of information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted from the validation;
- (c) Reference to available information relating to projects or technologies similar to the proposed CDM project activity under validation; and
- (d) Review, based on the approved methodology being applied, of the appropriateness of formulae and correctness of calculations.

3.2 Clarification requests, corrective action requests and forward action requests

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

JCI raises a corrective action request (CAR) if one of the following occurs:

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

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

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

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

JCI reports on all CARs, CLs and FARs in its validation report. This reporting is undertaken in a transparent and unambiguous manner that allows the reader to understand the nature of the issue raised the nature of the responses provided by the project participants, the means of validation of such responses and clear reference to any resulting changes in the DDs of the PoA or supporting annexes.

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The validation protocol consists of two tables. The different columns in these tables are described as followings.

Validation protocol tables

Table 1: Requirement checklist
<p>✧ Checklist Question :</p> <p><i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale DD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i></p> <p>✧ Reference :</p> <p><i>Gives reference to documents where the answer to the checklist question or item is found.</i></p> <p>✧ Means of verification (MoV) :</p> <p><i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i></p> <p>✧ Comment :</p> <p><i>The column is used to elaborate and discuss the checklist question and/or the conformance to the question.</i></p> <p>✧ Draft and/or Final Conclusion :</p> <ul style="list-style-type: none"> · <i>OK is used either acceptable based on evidence provided</i> · <i>Corrective Action Request (CAR) is used due to non-compliance with the checklist question.</i> · <i>Clarification Request (CL) is used when the validation team has identified a need for further clarification.</i> · <i>Forward Action Request (FAR) is used to highlight issues related to project implementation that require review during the first verification of the project activity.</i>

Table 2: Resolution of Corrective Action and Clarification Requests
<p>✧ Draft report clarifications and corrective action requests :</p> <p><i>If the conclusions from the draft Validation are a CAR, a CL or a FAR, these should be listed in this section.</i></p> <p>✧ Ref. to checklist question in table1& 2 :</p> <p><i>Reference to the checklist question number in Table1& 2 where the CAR, CL or FAR is explained.</i></p> <p>✧ Summary of project owner response :</p> <p><i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i></p> <p>✧ Validation conclusion :</p> <p><i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i></p>

The completed validation protocol for the Proposed Project is enclosed in Appendix A to this report.

4. STAKEHOLDER CONSULTATION PROCESS

JCI makes all DDs of the PoA under consideration publicly available in accordance with the latest version of the “Procedures for Processing and Reporting on Validation of CDM Project Activities”^{*1}.

^{*1} <http://cdm.unfccc.int/Reference/Procedures/valid_proc02.pdf>.

During the validation of the project activity, JCI takes into account the comments received and the validation report shall include details of actions taken to take due account of the comments during the validation process.

If comments are not sufficiently substantiated or indicate that the project activity does not comply with the CDM requirements, then JCI requests further clarification from the entity providing the comment. However, JCI is not required to enter into a dialogue with Parties, stakeholders or NGOs that comment on the CDM requirements. If no additional information or substantiation is provided in response to a request for clarification, JCI proceeds to assess the comments as originally provided.

III. VALIDATION WORK

JCI carried out the validation work to ensure that the project activity complies with the requirements of paragraph 37 of the CDM modalities and procedures.

1. Validation Team

Details of the validation team are shown in below Table.

Table 3. Details of Validation Team members

Role/Qualification	Name	Qualified Technical Areas related to the Project	On-site Visit
All relevant issues / Team Leader	Masaki OKADA	1.2 Renewable Energy	-
CDM auditor / Team Member	Shigeo AOKI	1.2 Renewable Energy	✓

Details of the technical reviewer are shown in below Table.

Name	Qualified Technical Areas related to the Project
Moritaka KATO	1.2 Renewable Energy

2. Appointment certificate of JCI validation team member

The certificate of appointment of validation team member is attached in Appendix B to the

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validation report.

3. Quality Control within the team of the Validation Process

The validation report worked out by the team undergoes an internal review process to ensure the compliance with the applicable requirement of VVM/40/.

JCI applies internally established Quality Management Program for the required review process, which is defined as follows;

1. Internal Review for the interim check by the internal audit team and the interim technical review by the technical reviewer
2. The evaluation of the validation work in the CDM evaluation committee consists of outside experts
3. Internal review for the final check by internal audit team and the final technical review by the technical reviewer

The review and evaluation including the technical review are implemented for every validation work by the competent personnel assigned in accordance with JCI's qualification scheme for CDM validation and verification.

4. Desk Review

4.1 Document review

The PoA-DD/1/, generic CPA-DD/3/ and specific CPA-DD/2/ were submitted to JCI in July 2011. The additional documents related to the PoA have been reviewed to verify the correctness, credibility and interpretation of the presented information. Furthermore, a cross-check between provided information and information from other sources has been done as an initial step of the validation process. A complete document list of all documents and evidence material is shown in below Table 4.

4.2 Document list

All the relevant documentation to be reviewed through the whole validation process is listed in tabular form in the following table (Table 4):

Table 4: Document list

No.	Title
	<Project related Documents>
/1/	CDM-SSC-PoA-DD version 5, 23/07/2012 "ETA Solar Water Heater Programme in South Africa"
/2/	CDM-SSC-CPA-DD version 5, 23/07/2012 as specific CPA-DD "Nelson Mandela bay Municipality Solar Water Heating Project – NMBM CPA-001"
/3/	CDM-SSC-CPA-DD version X, dd/mm/yyyy as generic CPA-DD
/4/	CDM-SSC-PoA-DD version 1, 03/07/2011, CDM-SSC-CPA-DD version 01, 03/07/2011 (Specific CPA), CDM-SSC-CPA-DD version X, dd/mm/yyyy (Generic CPA) for the global stake holder consultation
/5/	Agreement between ETA and Innovation Group, dated 02 December 2010

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No.	Title
/6/	Monitoring manual
/7/	ERPA Agreement ETA and Ministry for Foreign Affairs of Finland, dated May 2009
/8/	MOU between Eskom and ETA, dated May 2011
/9/	GENERGY Product Information and Installation Guidelines
/10/	Service Agreement between ETA and CEF,
/11/	Property and owner details and declaration (Agreement between SWH Supplier and householder), in which ceding of carbon rights and Eskom subsidy is agreed (Not available)
/12/	MOA between NMBM and Installation company (Lereko Sustainability (pty) Ltd), dated 26 June 2007
/13/	MOA between ETA and NMBM, dated 25 February 2011
/14/	Eskom Grid data sheet
/15/	1st customer's agreement for SWH installation in CPA001
/16/	Extract from minutes of Board meeting dated 02 September 2011
/17/	Board meeting minutes dated 24 February 2010
/18/	SWH System Specs
/20/	Appendix to CPA001
/20-1/	Appendix to CPA001 "Emission Reduction Calculation Sheet"
/20-2/	Appendix to CPA001 "SWH System Specs Sheet"
/20-3/	Appendix to CPA001 "Calculation Average Area of Collector Sheet"
/20-4/	Appendix to CPA001 "Installation schedule Sheet"
	<Approval letter >
/21/	Letter of Approval by South Africa DNA dated 01/03/2012
/22/	Letter of Approval by Finland dated 27/03/2012 (HEL7290-46,48,49,50)
/23/	Eskom's letter to notify the formal rebate amount for SWH Supplier's SWH dated 12/04/2011
/27/	Confirmation letter of the Municipality for Free Electricity and Water Allocation (Not available)
/28/	10 Year Low Pressure Marketing and Local Awareness rising (Not available)
/29/	Grid Factor Data published by Eskom
	<Referenced Documents (Methodology, Guidance, Criteria, etc. of UNFCCC)>
/30/	Standard for sampling and surveys for CDM project activities and programme of activities – EB65 Annex 2
/31/	Draft best practices examples focusing on sample size and reliability calculations
/40/	CDM Validation and Verification Manual (VVM) (Version 01.2), EB55 Annex 01
/41/	Baseline methodology AMS-I.J. "Solar water heating systems (SWH) version 01"
/42/	Baseline methodology AMS-I.D. "Grid connected renewable electricity generation version 17"

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No.	Title
/43/	Tool to calculate the emission factor for an electricity system. (Version 02.2.1)
/44/	Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories
/46/	Guideline on the demonstration and assessment of prior consideration of the CDM (version 04), EB62 Annex 13
/47/	Glossary of CDM terms (Version 06.0)
/49/	Guidelines on the demonstration of additionality of small-scale project activities
	<Referenced Documents (Books, Regulation, Code, of South Africa)>
/50/	Literature for “Binominal distributions” http://www.ucl.ac.uk/english-usage/staff/sean/resources/binomialpoisson.pdf
/51/	Eskom Annual Report 2011
/53/	Test Report by SABS for Supplier’s Solar Water Heater
/54/	South African National Standard for Domestic solar water heaters (SANS 6211-1:2003, SANS 151-2009, SANS 1307:2003)
/55/	Product brochure of SWH distributed by the Supplier
/56/	Wilson Score Interval http://en.wikipedia.org/wiki/Binomial_proportion_confidence_interval http://www.ucl.ac.uk/english-usage/staff/sean/resources/binomialpoisson.pdf
/57/	Binominal distributions, probability and Wilson’s confidence interval Dec 20 2009 (revised 2011)
/60/	Basic Water Requirements for Human Activities (Water International, 21(1996) 83-92)
/61/	Eskom 2009, The energy efficiency series – Towards Energy Efficient Mining Sector, p.8
/62/	A Guide to Environmental Impact Assessment (EIA) http://www.eiatoolkit.ewt.org.za/process/what.html
/63/	Report on the South African Solar Water Heater Industry – July 2009 W.Cawood, S.Theobald
/64/	Work Package 2 – Historical and recent attitude of stakeholders Case 19: Solar water heater (SWH) by G Prasad July, 2007 http://www.createacceptance.net/fileadmin/create-acceptance/user/docs/CASE_19.pdf
/65/	Renewable Energy Technology (RET) Working Group Global Network on Energy for Sustainable Development (GNESD)
/66/	SWH prevailing upfront cost http://www.timeslive.co.za/sundaytimes/article155336.ece
/67/	Electric geyser prevailing cost Averaged price of electric water heaters from quotations received from 3 geyser suppliers in South Africa (will be attached as an appendix?/reference file.)
/68/	Market survey of SWH in SA for Energy Development Corporation (EDC) of the Central Energy Fund (CEF) 2005-05-23 http://www.cef.org.za/solar_market_survey.pdf - Page 31, 7.4
/69/	SWH Catalogues possible to be installed
/70/	20 photos of scenes of public hearings

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No.	Title
/71/	Adverts in national and local news papers
/72/	Agenda showing time schedule, agenda items and presenter/ facilitator
/73/	Question and answers
/74/	Register of attendance with personal details
/75/	SWH Information Hand book prepared for attendance
/76/	Presentation material
/77/	Customer Participation Agreements
/78/	Plumbing Certificate of Compliance
/79/	Eskom Rebate Forms
/80/	Supplemental Installation protocols
/81/	Inspection protocols
/82/	Technical specifications such as tank size and collector size
/84/	Maintenance requirements for all SWH types
/85/	Estimated proportion of primary residence in total SWH installed houses

4.3 Review of documents submitted

Documents needed before the on-site audit was submitted and the review was conducted.

The findings through the review were listed in the Initial findings list and the responses to the validator's comment were provided prior the commencement of the on-site audit of which details are described in the following section IV.

Additional documents have been provided during the on-site audit for the discussion.

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration are listed in Table 4b below:

Table 4b. Major Changes in the Content of the PoA-DD and CPA-DD

Subject and section in the PoA-DD and CPA-DD	Original content in the PoA-DD/4/ and specific CPA-DD/4/	Revised content in the PoA-DD/1/ and specific CPA-DD/2/	- Issued CAR or CL. - Relevant methodology, tool, guidance, or guidelines applied. - Other reasons
PoA-DD A.2, A.4.2.1, A.4.2.2, A.4.3, A.4.4.1, E.2, E.7.2 CPA-DD B.2, B.6.1	Installation of SWH is targeted in <i>"residential and commercial applications"</i> .	Installation of SWH is targeted only in <i>"residential applications"</i> .	Commercial application is mistakenly included. Corrected due to comment from UNFCCC as a result of "incompleteness check".

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PoA-DD A.4.2.2 CPA-DD B.2 Eligibility criteria (Table 1)	Criteria for No.1 – 12 are listed in the table.	Additionality criteria as No.13 is added as an additional one.	Corrected due to comment from UNFCCC as a result of “incompleteness check”.
PoA-DD E.2 Justification of applicability of AMS-I.J	Justifications of applicability did not cover all conditions raised in the methodology AMS-I.J. Also descriptions of conditions are not same as those in the methodology.	All of 5 conditions (paragraph 1 – 5 of AMS-I.J) are listed in the PoA-DD and justification is correctly given to each items.	Added and corrected due to comment from UNFCCC as a result of “incompleteness check”.
PoA-DD E.6.1 Calculation of emission factor for grid-based electricity	According to the “Tool to calculate the emission factor for an electricity system” Version 02.1.0 (CM = 0.9798tCO ₂ /MWh) As for the applied equation for OM emission factor, it does not completely comply with the “Tool”.	Calculation procedure is revised based on the Version 02.2.1 (CM = 0.9737tCO ₂ /MWh) It is corrected that OM emission factor calculation is rightly based on the equation in the latest version of the Tool”.	CL-1 is issued. Clarification was properly done and the issued CL is resolved. corrected due to comment from UNFCCC as a result of “incompleteness check”.
PoA-DD E.6.2 & CPA-DD B.5.2. Calculation formula for Energy Savings (ES _y)	Coefficient for maintenance is not included in the ES _y calculation formula.	P _{plan,y} & P _{noplan,y} which are relevant coefficients for maintenance plan of SWH are incorporated to the equation.	CL-11 is issued. Clarification was accepted and the CL is closed accordingly.
PoA-DD E.7.2. Sampling calculation method	Sample size is determined based on the table for the “Binominal Distribution” with “Normal Approximation Interval”.	Sample size is determined based on the “Wilson Score Interval”, which is expected more reliable than “Normal Approximation Interval”.	CL-4 is issued. It is resolved with the appropriate clarification by PP.
CPA-DD A.4.4, B.5.3	Annual average reductions over crediting period = 24,458 tCO ₂	Annual average reductions over crediting period = 20,370tCO ₂	Clarification of CL-1 and CL-11 resulted the change of the estimation of yearly emission reductions.
CPA-DD A.4.2.1 CPA Starting Date	08/07/2011, wrongly defined	CPA-DD is correctly revised with the date of 10/08/2011, which is first installation date based on the customer’s agreement.	CL-15 is issued because the CPA starting date is not appropriate.

5. Follow-up actions (e.g., Onsite visit, Interviews with Project Stakeholders)

The on-site assessment and interviews with project stakeholders were held from 29 August to 01 September 2011 at the project site in Johannesburg and Port Elizabeth, the republic of South Africa. The names of interviewees and topics are listed in following table.

Table 6. List of interviewees

No.	Date	Name	Organization	Topic
/90/	29/08/2011	Mr. Jabulani Shabalala Mr. Robert Futter Mr. Andy Tant Ms. Nicole Algio Mr. Lehlogonolo Mr. Jürgen Wiesmann	ETA CRESCO IG CEF Carbon CEF Carbon Green Stream	<u>Interview with CME, PP & Project formation</u> <ul style="list-style-type: none"> · Role of CME (ETA) · Introduction of JCI to CME · ETA Company profile and Scheme of Project · Technical feature of SWH · Financial model · Project administration feature
/91/	30/08/2011	Mr. Corrie Schmidt Mr. Marius Petzer Mr. Manus Scheepers Mr. Terry Bilison Mr. Adrian Vermaak Ms. Nicole Algio Mr. Lehlogonolo Mr. Jürgen Wiesmann	NMBM ETA DSP Genergy Householder CEF Carbon CEF Carbon Green Stream	<u>Interview with NMBM Municipality, Installation Company, Product supplier & Local residents</u> <ul style="list-style-type: none"> · Observation of the site · Installation in NMBM area · SWH warehouse & Logistics · Interview with householder
/92/	31/08/ 2011	Mr. Raj Panddaram Ms. Michele Thomson Mr. Bheki Tsabedze Ms. Nicole Algio Mr. Lehlogonolo Mr. Jürgen Wiesmann	ESKOM W.E.GEYSER ETA CEF Carbon CEF Carbon Green Stream	<u>Interview with ESKOM & Manufacturing Factory</u> <ul style="list-style-type: none"> · ESKOM subsidy · Observation of manufacturing line
/93/	01/09/2011	Ms. Nicole Algio Mr. Lehlogonolo Mr. Jürgen Wiesmann	CEF Carbon CEF Carbon Green Stream	<u>Interview with CME & PP</u> <ul style="list-style-type: none"> · Initial Findings Review · Wrap-up meeting

IV. VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of validation and the results from the validation process are identified and documented in more detail in the validation protocol in Appendix A.

JCI issued one (1) CAR, sixteen (16) CLs and zero (0) FARs as shown in the Validation Protocol.

1. Approval

JCI have received the Letter of Approvals (LoAs) from relevant DNAs.

One is from the DNA of the Republic of South Africa and the others are from the DNA of Finland.

JCI confirmed the following on receipt of LoAs:

- 1) The DNA of the Republic of South Africa approved the proposed project and authorized ETA Energy (Pty) Ltd (formally CEF Sustainability Pty Ltd) as a voluntary participant to the proposed project and managing/coordinating entity, and addressed its cooperation with ETA Energy (Pty) and CDM EB to facilitate CDM project cycle.
Also it is confirmed in the LoA that the project supports sustainable development
- 2) The DNA of Finland approved the proposed project and authorized voluntary participation of the Ministry for Foreign Affairs of Finland, Fine Carbon Fund (FCF), Nordic Carbon Fund Ky (NCF) and Climate Opportunity Fund Ky (COF) as voluntary participants to the project.

There has been no indication during the validation process that the proposed project activity uses the official development assistance funding.

JCI validated and concluded that the LoAs named above are appropriately issued, credible and fully comply with the requirements by VVM/40/.

2. Participation

JCI has confirmed that the proposed project participants are ETA of the republic of South Africa and NCF, FCF and COF of Finland as being listed in tabular form in section A.3 of the PDD/2/, and also has confirmed that this information is consistent with the contact details provided in Annex 1 of the PDD/2/. It is further confirmed that no entities other than those approved as project participants are included in these sections of the PoA-DD/2/.

As described above, JCI has validated and concluded that the project participants are authorized with the LoAs issued by the relevant DNAs as a voluntary participant to the project activity.

3. Project Design Document

Through desk reviews and Q&A sessions with the project participant (PP), JCI confirmed that the DDs are described based on and referring to the following relevant methodology, tools, guidance, guidelines, and manual:

- (1) AMS-I.J. version 1.0 “Solar water heating systems (SWH)” /41/
- (2) AMS-I.D. version 17 “Grid connected renewable electricity generation” /42/
- (3) Tool to calculate the emission factor for an electricity system (version 02.2.1) /43/

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- (4) Simplified Modalities and Procedures for Small-Scale Clean Development Mechanism Project Activities /49/
- (5) CDM Validation and Verification Manual (VVM) (Version 01.2), EB55 Annex 01 /40/
- (6) Glossary of CDM terms (Version 06.0) /47/
- (7) Others

The project design was described using the appropriate template (SSC-PoA-DD version 01 and SSC-CPA-DD version 01) as shown in the DDs, which were confirmed through comparison with the template listed on the UNFCCC website.

As described above, JCI judged that the DDs (SSC-PoA-DD, generic SSC-CPA-DD and specific SSC-CPA-DD) are compiled with the appropriate format and are described based on appropriate tools, guidelines, manual and guidance which are specified and requested by the PoA procedures.

4. Project Description

JCI conducted on-site assessment from 29th August through 1st September 2011 to confirm the context of the DDs with the following measures:

- 1) Observation of the project site
- 2) Cross-check of the project design work with relevant documents provided by the project participants
- 3) Interviews with the Coordinating/Managing Entity; CME (ETA Energy) and the CDM consultant to the CME, relevant organizations/entities, and local stakeholders shown in Table 6 of section 5 of the previous Chapter.

As the result of the above observations and findings and through the clarifications of descriptions of the DDs after the on-site assessment, JCI judged that the descriptions of the DDs were correct and its context was sufficient, and well outlined the nature and technical aspects of the project activity.

The major features of the project activity described in the DDs for the first specific CPA (CPA001) are summarized below:

- Project type : Installation of SWHs for Max. 18,000 households /17/
- Q-factor : 8.58 MJ/m² (Average of SWHs in SWH System Specs/18/)
- Relevant EFs : ESKOM Power Grid/29/
- Estimated emission reductions: 20,370 t-CO₂e/year (ref. Appendix to CPA001/20/ “Emission Reduction Calculation Sheet”/20-1/)
- Crediting period : 10 years

5. Eligibility Criteria for CPA Inclusion

CME defined the distinct criteria for the inclusion of CPA in the section A.4.2.2. of the PoA-DD/1/. The defined eligibility criteria in the PoA-DD/1/ can be verified with regards to the followings:

- Only CPAs whose purpose is the installation of residential or commercial SWH for hot water

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production are eligible to be included in the PoA.

- A CPA shall demonstrate that the SWH systems displace electricity or fossil fuel that would otherwise have been used to produce hot water. It is sufficient to demonstrate that each SWH replaces an existing electric or fossil fuel-based water heating system. This can be done by demonstrating that an existing electric or fossil fuel-based system has been permanently disabled. All the SWH under the SSC-CPA comply with all relevant SABS/SANS Standard Specification for SWH systems.
- Only CPA that do not exceed the small-scale threshold for SWH projects of 64000 m² in aperture area are eligible for inclusion in the PoA.
- For each CPA it shall be demonstrated that the energy savings are based on the hot water consumption as defined in paragraph 5 of AMS IJ/41/. For CPAs that use the stipulated energy savings method it is sufficient to demonstrate that the average energy demand exceeds the stipulated energy savings of 450 kWh / year per m², as per section 10 (c) (iv) of AMS IJ/41/.
- For each CPA energy savings are determined by one of the methods listed in §10 of AMS IJ.: Model-based method / System metering method / Stipulated energy savings method.
- For each CPA, it has to be demonstrated that the applicability conditions of the chosen method (See 5.) to calculate energy savings are fulfilled.
- For each CPA monitoring is done according to paragraphs 13 and 14 of AMS IJ/41/.
- For each CPA, it does not have to be demonstrated that it is neither being registered as a single CDM project outside the PoA nor being included in another registered PoA.
- For each CPA it has to be demonstrated that it is not a de-bundled component of a large-scale CDM project activity.
- All installations in a CPA shall take place within the geographical boundaries of the Republic of South Africa.
- For all SWHs included in a CPA there must be a Customer Participation Agreement between the ETA and the owner of the SWH.
- Each CPA and each SWH in a CPA shall be uniquely identified by way of unique identifying numbers.
- For each CPA included in the PoA additionality shall be demonstrated using one of the following guidelines and applicable tools approved by the CDM Executive Board.
 1. “Guidelines on the demonstration of additionality of small-scale project activities”, Version 09. It needs to be shown that in the absence in the CPA, emission reductions would not occur due to the existence of barriers. If the barriers for the CPAs are identical to the barriers faced by the overall PoA as detailed in section A.4.3, it is sufficient to demonstrate that the barriers preventing the PoA are still in existence at the starting date of the CPA. Inasmuch as the penetration rate of SWHs in South Africa is relevant to demonstrate the existence of barriers, it should be distinguished between those SWHs that are installed with the benefit of carbon revenue from the CDM and those SWH that are installed without such revenue. Only SWH that are installed without carbon revenue should be counted as part of the penetration rate.
 2. “Guidelines for Demonstrating Additionality of Micro-scale Project Activities”, Version 04. In particular it needs to be demonstrated that

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- (a) the installed capacity of the SWHs in the CPA is less than 5 MW;
- (b) the CPA is designed for distributed energy generation (, i.e. the SWHs are not connected to a national or regional grid);
- (c) Each of the SWHs in the CPA is smaller than or equal to 1500kW electrical installed capacity;
- (d) End users of the SWHs are residential households

JCI confirmed that the definition of eligibility criteria as stated above for inclusion of a project activity as a CPA under the PoA appropriately include 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 are to be provided by each CPA in order to ensure its eligibility;

Also JCI confirmed the eligibility criteria above sufficiently cover the items to be checked at the CPA level by the CME as well as by the DOE during inclusion.

6. Operational and Management Plan

Record keeping system for project operation and management

A distinct and transparent description of the operational and management arrangement has been established by CME and described in the section A.4.4.1 in the PoA-DD/1/.

There is a record keeping system for each CPA under the PoA.

JCI carefully reviewed information to be included in the central electronic database which are described in the tabular form in the PoA-DD/1/, and confirmed all of required items are covered meeting to criteria in AMS-IJ/41/.

Also following copies of original documents are properly listed in the PoA-DD which is to be kept in the data base as well:

1. Customer Participation Agreements/77/
2. Plumbing Certificate of Compliance/78/
3. Eskom Rebate Forms/79/
4. Supplemental Installation protocols/80/
5. Inspection protocols/81/
6. Technical specifications such as tank size and collector size/82/
7. SABS Test Reports and SABS Approvals/53/
8. Maintenance requirements for all SWH types/84/

Documents above are provided to the extent possible at the validation stage and JCI confirmed the relevant data transaction can be properly performed according to the prepared protocol and relevant document.

System/Procedure for avoiding double accounting

The system and procedure to avoid double counting has been indicated in the PoA-DD/1/.

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In principle, JCI judges that the orderly operation and management of documents listed above, especially 1 to 5 surely enable person in charge to avoid double accounting.

In the CPA-DD/2/, it is stated that CME is to confirm the CPA is not registered as an individual CDM project activity or not a part of any other registered PoA.

JCI considers that above mentioned system/procedure and CME's statement shall ensure to avoid double accounting.

Not being a de-bundled component of another CDM

In the PoA-DD/1/, it is properly described that *AMS I.J/41/ refers to §4(d) of the “General Guidelines to SSC CDM methodologies, i.e. a threshold of 64,000 m² of aperture area of the solar collectors. 1% of the threshold is 640m², which far exceeds the typical collector areas for residential SWH. The collector area for a typical SWH installed as part of the CPA is expected to be between 1.8 m² and 4.2 m².*

JCI considers the description above in the PoA-DD is credible with reference to technical data of all possible SWHs provided as evidence/69/.

7. Baseline and monitoring methodology**7.1 Applicability of selected methodology to the project activity**

According to the PoA-DD, it is described that the CPA under the PoA will apply the small scale methodology AMS-I.J/41/. “Type I – Renewable Energy Project, Solar water heating systems (SWH)”, version 1.0.

The proposed PoA is the thermal application of solar energy project of which eligibility limit for being “Small- Scale CDM Project Activity” for each CPA is 64,000 m² of the total number of installed square meter of collectors as defined in the paragraph 7 – (d) in “Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories /44/” published by EB.

The number of SWH installed for the first CPA under the proposed PoA (NMBM CPA-001) is planned to be 18,000 and the collector area of respective SWH is an average of 3.41 m² according to the submitted Appendix to CPA001/20/ (“Emission Reduction Calculation Sheet”/20-1/, “Calculation Average Area of Collector /20-3/ and “Installation schedule/20-4/), which means the total aperture area of the collectors (= 18,000 x 3.41 = 61,380 or 61,344 m²) is less than 64,000 m².

JCI validated the assumption of the average collector area (= 3.41 m²) as follows:

According to the Appendix to CPA001/20/ (“SWH System Specs”/20-2/, “Calculation Average Area of Collector”/20-3/ and “Installation schedule”), the expected installed SWH is calculated as follows:

Tank Size (Liter)	Share (%)	Average Area (m ²)	Calculated Av.(m ²)
300	54.5	3.91	2.13
250	18.7	3.95	0.74
200	1.1	2.19	0.02
150	25.7	2.00	0.51

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100.0

3.41

3.41

Share is just an assumption as well as total installation (= 18,000) by PP and JCI can accept as it is.

On the basis of such assumption, JCI considers that the calculation procedure of the average collector area (= 3.41 m²) is reasonable.

Accordingly, the total number of installed square meter of collectors (61,380 m² or 61,344 m²) can be correctly said less than 64,000 m².

Therefore, JCI confirmed that the proposed PoA is rightly classified as a small-scale project, and it can be said that it is appropriate to choose AMS-I.J/41/ as the applied methodology for the proposed PoA.

As for the applicability of the methodology, more precise confirmation of all of five (5) applicability conditions raised in the methodology together with respective justification can be summarized below as appropriately conducted in the PoA-DD as per paragraph 76 in VVM 1.2/40/:

No.	Applicability	Justification
1	This category comprises the installation of residential solar water heating (SWH) systems and commercial SWH systems for hot water production. The SWH systems displace electricity or fossil fuel that would otherwise have been used to produce hot water.	According to section A.4.2.2 only CPAs whose purpose is the installation of residential SWH for hot water production are eligible to be included in the PoA. According to section A.4.2.2 a CPA shall demonstrate that the SWH systems displace electricity or fossil fuel that would otherwise have been used to produce hot water.
2	There are two types of projects included in this category: retrofits and new construction. For the purposes of defining baselines and other requirements the following definitions apply: (a) Retrofit projects are SWH project(s) that replace existing electric or fossil fuel based water heating system(s) in existing facility(ies); (b) New construction projects are: (i) SWH project(s) installed in new facility(ies); (ii) SWH project(s) installed in existing facility(ies) that, prior to the project implementation, do not have installed water heating systems; (iii) SWH project(s) installed in	Only CPAs that are retrofit projects qualify for the PoA. According to section A.4.2.2 a CPA shall demonstrate that the SWH systems displace electricity or fossil fuel that would otherwise have been used to produce hot water. It needs to be demonstrated that each SWH replaces an existing electric or fossil fuel-based water heating system. This can be done by demonstrating that an existing electric or fossil fuel-based system has been permanently disabled.

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	<p>existing facility(ies) which require water heating capacity expansions; or (iv) Replacement of failed solar water heating system(s).</p> <p>This methodology is applicable if it is shown (as per paragraph 8) that for new construction projects, conventional electric or fossil fuel based water heating system(s) would have been installed in the absence of the project activity.</p>	
3	Commercial SWH systems shall include operational indicators that may be easily interpreted by the intended users of the systems and that indicate that water is being heated by solar energy. The minimum requirement for such an indicator is a visible temperature display (thermometer) on the solar preheat storage tank. The thermometer does not require calibration.	Not applicable. According to section A.4.2.2 only CPAs whose purpose is the installation of residential SWH for hot water production are eligible to be included in the PoA.
4	To qualify as a small-scale project, the definitions in paragraph 4(d) in the “General Guidelines to SSC CDM methodologies” (version 15), or the related paragraphs in the latest version of the guidelines are applicable.	The small-scale threshold for SWH projects in terms of aperture area is 64,000 m ² . According to section A.4.2.2 only CPAs that do not exceed the threshold are eligible for inclusion in the PoA.
5	For residential and commercial SWH projects the hot water consumption rate and temperature at which the hot water is supplied to the load, are used to determine emissions savings. The consumption rate (and temperature) is the rate (and temperature) of water actually utilized and is not the rate (and temperature) at which hot water is produced.	According to section A.4.2.2 the energy savings have to be based on the hot water consumption as defined in paragraph 5 of AMS I.J. For CPAs that use the stipulated energy savings method it is sufficient to demonstrate that the average energy supply is less than the average energy demand as per section paragraph 10 (c) (iv) of AMS I.J.

7.2. Project boundary

The PoA is located within the geographical boundaries of South Africa.

The physical boundary of the first specific CPA (CPA001) is the SWHs in the individual households on which SWH are installed under the proposed PoA as described in the CPA-DD/2/.

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The geographical boundary of CPA001 is identified clearly in the CPA-DD/2/ as Nelson Mandela Bay Municipality (NMBM) close to Port Elizabeth in South Africa.

During the on-site audit, JCI confirmed with a representative of NMBM that the description about the project boundary is credible.

7.3 Application of baseline and monitoring methodology

7.3.1. Baseline

As described in the section E of the PoA-DD, the applied baseline and monitoring methodology is AMS-IJ/41/.

In the Table 3 in section E.2. of the PoA-DD/1/, applicability criteria of AMS-IJ for CPA is raised and justification is conducted respectively.

JCI deemed the result of justification for all criteria is credible and AMS-IJ/41/ is surely applicable to the proposed project.

As clearly described in the PoA-DD, the purpose of any CPA under the PoA is the installation of SWHs in residential or commercial applications in the Republic of South Africa. The installed SWHs replace existing water heating systems (predominantly electric geysers) that would otherwise have been used to produce hot water and that would otherwise have consumed grid-based electricity or fossil fuels. As a result, the CPAs reduce the consumption of grid-based electricity or fossil fuels as well as the related carbon emissions.

Also it describes that the PoA allows different SWH systems to be included in a CPA as long as they have successfully completed quality testing by the South African Bureau of Standards/54/ and its test report is to be approved by SABS/53/. All major components of the installed SWH systems are quality-tested in order to ensure that the installed SWHs are able to withstand local climatic and water quality conditions.

All SWHs are installed by South African companies that have the necessary qualifications, experience and training for the installation of SWH.

SWH system may use different technologies, such as flat plate or evacuated tube collector technologies. Both direct and indirect SWH systems qualify for the inclusion into a CPA. In direct systems, the drinking water is heated directly by the solar panels. In indirect systems an anti-freeze fluid circulates in the solar collectors but is physically separated from the hot water circuit. The two systems are connected via a heat exchanger.

Each direct system typically consists of:

1. Solar panels;
2. Storage tank;
3. Equipment to protect against potential high pressure;
4. Piping and equipment to link collector and tank;
5. Solar collector array support/fixation structure;

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6. Piping system for cold water supply and hot water supply to user;
7. Electrical backup (if the system is connected to an electrical supply);
8. Regulated circulation pumps (if the system is forced circulation).

Each indirect system typically consists of:

1. Anti-freezing liquid;
2. Heat exchanger;
3. Solar panels;
4. Storage tank (existing or new);
5. Equipment to protect against potential high pressure;
6. Piping and equipment to link collector and tank;
7. Solar collector array support /fixation structure;
8. Piping system for cold water supply and hot water supply to user;
9. Electrical backup (if the system is connected to an electrical supply);
10. Regulated circulation pump (if the system is forced circulation).

During the on-site audit, JCI observed above two different types of SWHs and confirmed the physical features and functionality of each SWH exactly as stated above.

In consideration of the above mentioned background of the PoA and technical details, JCI judges that the baseline and project emission sources summarized in the Table 4 in the section E.3. of PoA-DD is appropriate.

As PP chose the Stipulated Energy Saving method as an emission reduction estimation approach in AMS-I.J/41/, emission reduction are calculated as per paragraph 10 (c) (i) and (ii), which read as follows;

This method is only applicable to residential SWH system projects that displace electricity for water heating. There are two allowable stipulated energy savings values:

- (i) *For applications that can be reasonably demonstrated to have substantial hot water consumption demand year round: a single value of 450 kWh/year per square meter of collector area is stipulated for energy savings and is based on 5 kWh/m²/day solar resource, 25% solar water heater efficiency, and 365 days/year of hot water use;*
- (ii) *For applications that cannot be reasonably demonstrated to have substantial hot water consumption demand year round: * a single value of 300 kWh/year per square meter of collector area is stipulated for energy savings.*

In short, the emission reduction for this PoA applying AMS-I.J is calculated based on the energy savings values under the conditions stated in the above (i) and (ii).

Accordingly, usual detailed calculation of baseline and project emission is not required.

* Such applications can be residences that are temporary or seasonal housing or located in regions with very hot summers, for example, during which season(s) there is no or limited demand for hot water.

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In addition, according to the same line of consideration, leakage emission is also excluded in the calculation of emission reduction.

This conclusion is elaborated in the PoA-DD and JCI validated in the following section 7.3.3.;

7.3.2. Baseline emission/Project emission/Leakage

As per judgment stated in 7.3.1 above, there is a legitimate reason to judge that the baseline emission, project emission and leakage are not considered in terms of estimation of emission reduction.

7.3.3. Emission reductions of a CPA (ER_y)

(1) Emission Reductions

Since the proposed PoA applies AMS-I.J/41/ as a methodology, the paragraph 9 of AMS-I.J. is referred in the PoA-DD, which reads as follows:

“Emission reductions are calculated as the energy savings that result from the project implementation multiplied by an emission factor for the electricity and/or fossil fuel displaced. For calculating the emission factor for displaced fossil fuels, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are documented to be either not available or not reliable. For the emission factor for displaced electricity, an annual emission factor shall be calculated, in accordance with the provisions in AMS-I.D “Grid connected renewable electricity generation” (tCO₂/MWh). ”

In addition, the paragraph 10 of AMS-I.J/41/ states that “Energy savings that result from the project implementation shall be determined using one of following methods and the choice of a method shall be made *ex ante* and specified in the PDD and cannot be changed during the crediting period. These three are not presented in order of preference.”

And those three methods are titled as follows:

- (a) Model based method
- (b) System metering method
- (c) Stipulated energy saving method

The method (c) which is titled “Stipulated energy saving method” is explained as follows in the methodology:

This method is only applicable to residential SWH system projects that displace electricity for water heating. There are two allowable stipulated energy savings values:

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- (i) *For applications that can be reasonably demonstrated to have substantial hot water consumption demand year round: a single value of 450 kWh/year per square meter of collector area is stipulated for energy savings and is based on 5 kWh/m²/day solar resource, 25% solar water heater efficiency, and 365 days/year of hot water use;*
- (ii) *For applications that cannot be reasonably demonstrated to have substantial hot water consumption demand year round: a single value of 300kWh/year per square meter of collector area is stipulated for energy savings.*

The appropriate value is multiplied by the aggregate collector area verified to have been installed by the project activity. This method is applicable only when all the following conditions are satisfied:

- (i) *Individual solar collector area per system is less than or equal to eight square meters per residential unit (e.g. eight square meters for a single family residence or 32 square meters for a four unit apartment building);*
- (ii) *The tilt and orientation of the solar collectors shall be +/- 45 of due-equator and a tilt +15 to -25 degrees of latitude;*
- (iii) *Thermal storage volume (preheat tank volume) is either: (a) At least 50 litres per square meter of collector area; or (b) Adequate to bridge time gap between solar supply and load demand during an average winter day for a typical installation, as demonstrated by calculation or model;*
- (iv) *The sizing calculations of the SHW systems are documented to be such that the average annual, daily amount of water heated by the SWH systems is less than or equal to the average annual, daily hot water demand for a typical installation;*
- (v) *There must be no shading of the solar collectors between 10 am to 2 pm on the shortest day of the year at the time of installation;*
- (vi) *The quality and performance of the solar collectors and SHW systems shall meet the criteria in the OG100 standard at <www.solar-rating.org>, or equivalent national or international standard, or the requirements given below:*
- *Unglazed collector must be stabilized against UV degradation;*
 - *Glazed collector must have at least one glass cover and be insulated on the sides and back to achieve a loss coefficient not more than 5 W/m²C;*

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- *Evacuated tube collector must maintain vacuum insulation between absorber and ambient.*

According to the above stated criteria in the methodology and Table 1 in Annex 1 to the methodology, the SWH in the proposed PoA falls under the category of “Very Small” since the size of collector area for each SWH is 3.53 m^2 ($< 8 \text{ m}^2$), expected number of installation is “Very many” and expected to be supplied for “Residential”.

Therefore it is appropriate that the method (c) is chosen for the specific CPA (NMBM CPA-001) among the above raised three methods specified in the methodology although any method could be chosen.

The approach taken by PP in this regard is rightly described in the PoA-DD as follows:

1. *It is demonstrated in section B.2 of the SSC-CPA-DD that the CPA fulfills the applicability conditions of the Stipulated Energy Savings method in paragraph 10 (c) of AMS I.J.*
2. *For each installed SWH it is determined whether it “can be reasonably demonstrated to have substantial hot water consumption demand year-round.” For all SWH applications in primary residences no further demonstration of year-round hot water consumption demand is necessary. The classification of a building as primary residence is done by the installer and recorded in the installation protocol.*
3. *The stipulated energy savings values are applied according to paragraph 10 (c) (i) and (ii).*
4. *The stipulated energy savings are multiplied by the emission factor for grid-based electricity, which is derived below.*

(2) Emission Factor for grid-based electricity

In accordance with the “Tool to calculate the emission factor for an electricity system” /43/ and the PoA-DD/1/, the calculations in the PoA-DD are validated with the following 7 steps:

Step 1: Identify the relevant electricity system

JCI confirmed that Eskom is appropriately defined as the relevant electricity system based on the latest version of the South Africa grid information/29/ available on the Eskom web-site.

It is obvious that Eskom dominates the electricity supply market and only a few municipal and private generators exist according to the “Eskom Annual Report 2011”/51/. Accordingly it is considered to be acceptable that the Eskom represents the electricity production industry in South Africa, as it produces 96% of electricity in South Africa according to the Eskom annual report 2011.

Step2: Choose whether to include off-grid power plants in the project electricity system (optional)

In line with the grid information issued by Eskom/29/, the PoA-DD/1/ selected Option I: *Only grid power plants are included in the calculation*. JCI assesses that the selection of Option I is correct and appropriate complying with the grid information as the relevant electricity system.

Obviously no off-grid is chosen in the Eskom grid.

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

The simple OM method is appropriately applied satisfying the applicable conditions specified in Emission Tool/43/: the dispatch data from the grids in South Africa is not publically available, and low-cost/must-run resources of Eskom grid in the average of the last five years from year 2006 through 2010 satisfies the specified ratio less than 50% of total grid generation. In the PoA-DD/1/, the option A of Simple OM is rightly selected here.

Ex-ante option is selected and then a 3-year generation-weighted average, based on the most recent available data at the time of submission of the PoA-DD/1/ for validation is appropriately worked out using Eskom grid data/2/.

Step 4: Calculate the Operating Margin emission factor according to the selected method

Option A is properly selected for the calculation of simple OM considering the conditions of the connecting Eskom grid, since:

- Necessary data for selecting Option A is available in South Africa
- Low-cost/must –run power generation sources in Eskom grid are in comply with the requirement and their data are available
- Off-grid power generation plants are excluded in the calculation

Calculations are correctly conducted using equations in the PoA-DD/1/ that are consistent with those in Emission Tool. The data and parameters used are appropriately derived from the data sources listed above.

As a result, the OM emission factor is calculated to be 0.9694 tCO₂e/MWh, as shown in the PoA-DD.

Equation (1) below in the PoA-DD is correct with reference to the relevant part (Equation 1 & 2) of the applied tool/43/

$$EF_{\text{grid,OMsimple},y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} = 0.9694 \text{ tCO}_2/\text{MWh}$$

Where,

$$EF_{EL,m,y} = \sum_i [\sum_m FC_{i,m,y} * NCV_{i,y} * EF_{CO2,i,y}] / \sum_m EG_{m,y}$$

with

$EF_{\text{grid,OMsimple},y}$ = Simple operating margin CO₂ emission factor in the year y, tCO₂/MWh

$FC_{i,m,y}$ = Amount of fossil fuel type i consumed by power plant/unit m in the year y, mass or volume unit

$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel i in year y (GJ/mass or volume unit)

$EF_{CO2,i,y}$ = CO₂ emission factor of fossil fuel type i in year y, tCO₂/GJ

$EG_{m,y}$ = Net electricity generated and delivered to the grid in year y, MWh

m = All power plants/units serving the grid in year y except low-cost/must-run power plants/units

i = All fossil fuel types combusted in the power plant/unit m in year y

y = Either the three most recent years for which data is available at the time of

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submission of the CDM-PDD to the DOE for validation (ex-ante option) or the applicable year during monitoring (ex-post option).

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

Option 1 (ex-ante option) is chosen and then BM calculation is worked out according to the procedure stipulated in the applied tool/43/.

(a) Set_{5-units}: As the set of the most recently build power plants, Kendal (1988), Majuba (1996), Ankerlig (2007), Gourikwa (2007) and Palmiet (1988) is rightly selected. The annual total generation is 45,654,000 MWh (AEG_{SET-5-units}).

(b) Set_{>20%}: In the PoA-DD, Kendal (1988), Majuba (1996), Ankerlig (2007) and Gourikwa (2007) are selected and its total electricity generation is 45,654,000 MWh which is a little bit more than 20% of the total annual electricity generation of the project electricity system (AEG_{total} = 216,850,303 MWh)

(c) According to the stipulation in the tool/43/, it becomes that SET_{sample} = SET_{5-units} = SET_{>20%} in the case of the proposed project.

As Kendal and Majuba are more than 10 years since starting operation, it is to proceed (d), (e) and (f) for BM calculation following the procedure.

(d) No power plant registered as CDM project in the Eskom data base, this step is skipped.

(e) In order to reach 20 % of total annual generation, Kendal (1988), Majuba (1996) and Palmiet (1988) are to be included in SET_{sample-CDM}.

(f) Now in SET_{sample-CDM-10yrs}, Kendal (1988), Majuba (1996), Palmiet (1988), Ankerlig (2007) and Gourikwa (2007) are to be included as sample group to calculate the build margin.

JCI reviewed the description of BM calculation procedure in the PoA-DD, and confirmed properly worked out in the equation (29) in the PoA-DD as follows, which rightly complies the applied methodological tool/43/:

$$EF_{\text{grid,BM},y} = \frac{\sum_m EG_{m,y} * EF_{EL,m,y}}{\sum_m EG_{m,y}} = 0.9780 \text{ tCO}_2/\text{MWh}$$

Step 6: Calculate the combined margin emission factor:

JCI confirmed that CM emission factor is calculated based on the option (a), as follows:

$$EF_{\text{grid,CM},y} = EF_{\text{grid,OM},y} * W_{\text{OM}} + EF_{\text{grid,BM},y} * W_{\text{BM}} = 0.9737 \text{ tCO}_2/\text{MWh}$$

From this project, $W_{\text{OM}} = W_{\text{BM}} = 0.5$ for the crediting period.

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to 0.85285 tCO₂/MWh, correctly following the equation (13) of the relevant tool/43/. The default weight of 50% is appropriately applied to both OM and BM emission factors for the calculation.

JCI also confirmed that the above calculations can be replicated based on equations in the PoA-DD/1/ and data available in the Eskom Grid data sheet/14/.

(3) Emission reduction

In the PoA-DD, emission reduction is calculated as follows according to paragraph 9 and 11 of AMS-I.J/41/:

$$ER_y = EF_y * ES_y / (1 - TDL) \quad (1)$$

Where:

ER_y: Emission reductions in year y (t CO₂)
 EF_y: Carbon emission factor for grid-based electricity in year y (t CO₂ / MWh)
 TDL: Transmission and distribution losses (%)
 ES_y: Electricity savings in year y (MWh)

Above formula is derived based on the understanding of the description of paragraph 9 and 11 of AMS-I.J/41/, and JCI considers that PP's interpretation is correct.

Here, EF_y is obtained in the above (2) and its value is 0.9737 tCO₂/MWh.

As for TDL, which represents transmission and distribution losses, the value of 8.25% is used in the CPA-DD for the calculation of emission reduction.

JCI raised CL-3 in the validation protocol for the justification of the value, and PP clarified it in that the value is derived from Eskom Annual Report/51/ in which 8.25% is published as the figure of the losses of the grid.

JCI checked with the submitted Eskom Annual Report 2011/51/ and confirmed the figure in the report. In addition, using such data as TDL is meeting to the requirement in the paragraph 11 of the AMS-I.J/41/, JCI accepted PP's clarification and CL-3 is closed.

Furthermore, ES_y is calculated as below as per PoA-DD.

Regarding the ES_y calculation formula, JCI raised CL-11 in the protocol for requesting the clarification due to inconsistency with the submitted Emission Reduction Calculation Spread sheet (Appendix to CPA001/20/ "Emission Reduction Calculation Sheet"/20-1/).

PP responded with revised calculation formula as follows and JCI judged as appropriate and CL-11 is closed.

$$ES_y = P_{plan,y} * \sum_j f_{j,y} * [A_{j,corr} * (YRD_j * 450 \text{ kWh} + (1 - YRD_j) * 300 \text{ kWh})] \\ + P_{noplan,y} * \sum_k f_{k,y} * [A_{k,corr} * (YRD_k * 450 \text{ kWh} + (1 - YRD_k) * 300 \text{ kWh})] \quad (2)$$

with consideration of "P_{plan,y} = $\sum_m I_{m,y}$ " and "P_{noplan,y} = $\sum_l I_{l,y}$ "

Where:

Data/parameter	Description
ES _y	Electricity savings in year y (MWh)
f _{i,y}	Fraction of year y, during which SWH _i was operational
A _{i,corr}	Corrected collector area of SWH _i (m ²) in order to ensure conservativeness in

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	line with the requirements of AMS I.J.
YRD_i	Confirmation whether SWH application has hot water consumption demand year-round. YRD takes the value 1 if there is year-round hot water consumption, for example whenever a residential building is the primary residence. YRD takes the value 0 if there is no year-round hot water consumption, for example if a residential building is a secondary residence or rented to tourists.
$P_{plan, y}$	Percentage of SWH systems operating and in compliance with manufacturer-required maintenance procedures among SWHs that are either maintenance-free or are under a maintenance plan during the monitoring period. The percentage is established via bi-annual inspection of a sample of SWHs as described in section B.6.1.
$P_{noplan, y}$	Percentage of SWH systems operating and in compliance with manufacturer-required maintenance procedures Percentage of SWHs that have successfully passed the bi-annual inspection among SWH that require maintenance and are not covered by a maintenance plan during the monitoring period. The percentage is established via bi-annual inspection of a sample of SWHs as described in section B.6.1.
$I_{m,y}$	Result of bi-annual inspection in year y. $I_{m,y} = 1$ if the SWH _m successfully passes the inspection. $I_{m,y} = 0$ if the SWH m fails the inspection.
$I_{l,y}$	Result of bi-annual inspection in year y. $I_{l,y} = 1$ if the SWH _l successfully passes the inspection. $I_{l,y} = 0$ if the SWH l fails the inspection.
j	$j = 1, 2, 3, \dots, n$; for SWH installed in buildings that have substantial hot water consumption year-round
k	$k = 1, 2, 3, \dots, n$; for SWH installed in buildings that do not have substantial hot water consumption year-round
m	$m = 1, 2, 3, \dots, M$; where M is the sample size for SWHs that are either maintenance-free or are under a maintenance plan
l	$l = 1, 2, 3 \dots L$; where L is the sample size for SWHs that require maintenance and are not covered by a maintenance plan

Here, the figure of 450kWh is stipulated yearly energy savings derived based on 5 kWh/m²/day solar resource, 25% solar water heater efficiency, and 365 days/year of hot water use, which is described in paragraph 10 (c) (i) of the AMS-I.J/41/.

As for YRD, it is assumed 99% in the ex-ante calculation. And JCI deems it is reasonable that most application of SWH is likely for a primary residence rather than a seasonal or temporary residence.

The figure of 300kWh is stipulated energy saving for a seasonal or temporary residence according to paragraph 10 (c) (ii) of the AMS-I.J and JCI deemed as appropriate.

As far as the parameter $P_{plan, y}$ is concerned, it denotes “percentage of SWH systems operating and in compliance with manufacturer-required maintenance procedures among SWHs that are either maintenance-free or are under a maintenance plan during the monitoring period. The percentage is established via bi-annual inspection of a sample of SWHs” as described in section B.6.1 in the CPA-DD.

JCI confirmed the submitted maintenance manuals that respective maintenance interval of SWH is “maintenance free” or “6-years” with 10 year warranty, which assures of assumption regarding the maintenance plan for SWH.

Regarding a parameter of “ $f_{i,y}$ ”, which means a fraction of operational SWH, it is assumed as follows:

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- 100%, if SWH is installed at the beginning of year y, and 40%, if SWH installed during year y.

In the protocol, JCI requested PP to clarify the justification of value of “ $f_{i,y}$ ” as part of CL-11 in the validation protocol and PP responded as follows:

The 40% reflects that SWHs that are installed during year y contribute energy savings only for a portion of the year. 50% could be used as a default given that it is unknown in advance at what time during the year the SWH will be installed. 40% has been chosen in order to ensure conservativeness.

JCI took it as reasonable and accepted PP’s clarification and CL-11 was closed accordingly.

Validation of parameter “ $A_{i,corr}$ ”

The actual collector area A_i is needed to be corrected in order to ensure conservativeness in line with the requirements of paragraph 9 (c) (iii) and (iv) on page 5 of the methodology, AMS I.J/41/.

Above mentioned applicability condition (iii) requires that “Thermal storage volume (preheat tank volume) is either: (a) At least 50 litres per square meter of collector area; or (b) Adequate to bridge time gap between solar supply and load demand during an average winter day for a typical installation, as demonstrated by calculation or model.”

By setting a maximum for $A_{i,corr}$ of $TS_i / (50 \text{ l/m}^2)$, it is ensured that any SWH included in the database will always meet condition (a) above.

Applicability condition (iv) in AMS-I.J/41/ requires that “The sizing calculations of the SWH systems are documented to be such that the average annual, daily amount of water heated by the SWH systems is less than or equal to the average annual, daily hot water demand for a typical installation.” By setting a maximum for $A_{i,corr}$ of $A_{i,demand}$ it is ensured that any SWH included in the database will always meet this condition. $A_{i,demand}$ is calculated based on the number of people in the household, the average hot water consumption per person, the hot water temperature, the inlet water temperature, and the stipulated energy savings per m^2 according to AMS I.J/41/.

$$A_{i,corr} = \min [A_i ; TS_i / (50 \text{ l/m}^2) ; A_{i,demand}] \quad (3)$$

Where:

Data/parameter	Description
$A_{i,corr}$	Corrected collector area of SWH_i (m^2)
A_i	Actual collector area of SWH_i (m^2)
TS_i	Tank size of SWH_i (liters)
$A_{i,demand}$	Collector area required to produce average annual hot water demand (m^2)
i	$i = 1, 2, 3, \dots, n$; for SWH installed in buildings that have substantial hot water consumption year-round

$$A_{i,demand} = N_i * V_d * m * G * (T_h - T_c) / Q_{450} \quad (4)$$

Where:

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N_i	Number of people in household served by SWHi (unit-less)
V_d	Average annual hot water consumption per person (50 liters / day)
m	Mass of water (1.00 kg / liter)
G	Specific heat capacity of water (4.18 kJ / (°C * kg))
T_h	Temperature of hot water (65°C)
T_c	Temperature of cold inlet water (14°C)
Q_{450}	Stipulated energy supply for SWH in households with hot water consumption demand year-round (4.438 MJ / m ² / day, equivalent to 450 kWh per year)

JCI reviewed above procedure of calculation of $A_{i,corr}$ in terms of consistency with the applied methodology, and all of relevant parts of the proposed project assumptions.

Under the above-mentioned conditions and equations (1), (2), (3) and (4), emission reductions are calculated as shown in the emission reduction calculation sheet for CPA001 detailed in Appendix to CPA001/20/ (ref. "Emission Reduction Calculation Sheet"/20-1/), and JCI checked the calculation result taking all of relevant assumptions into consideration and judged that the 10-year total emission reductions of 203,701 tCO₂ detailed in the above-mentioned ER calculation sheet/20-1/ is correct and acceptable .

8. Additionality

8.1. Additionality of the Programme

The proposed PoA is coordinated by ETA Energy, which is a 100% subsidiary owned by CEF (Central Energy Fund) and there is no laws or regulations for the installation of SWHs in residential or commercial applications in South Africa and is thus a voluntary action.

8.2. Prior consideration of the clean development mechanism

It is stated in the EB 60 Report, Annex 26 that the Guidelines for the demonstration and assessment of "Prior Consideration of the CDM" do not apply to PoAs, as at present it is expected that no component of the programme will commence prior to the start date of validation.

The starting date of this PoA is 24th February 2010 and the date of PoA for GSC is 9th July 2011. And also the starting date of CPA001 is 10/08/2011, which is evidenced by the 1st customer's agreement for SWH installation in CPA00/15/.

The date of 24th February 2010 is the day when the Board of the Central Energy Fund (CEF) approved the pilot phase of the PoA and allocated funds to the project team (ETA).

JCI confirmed the submitted Board Meeting Minutes/17/ that the date of 24th February 2010 is surely the key date when the project participant was committed to take real action for the PoA because the ZAR 10 million was released for the rollout of the first 500 SWHs which is the resolution of the said board meeting.

Also the timeline of key events are tabulated in the PoA-DD and JCI confirmed all key events are credible with the submitted evidences.

8.3. Additionality of CPA001

As the PoA applies the small scale methodology, the additionality can be demonstrated using the guidance given in “[Guidelines on the demonstration of additionality of small-scale project activities /49/](#)” in which the project participant is required to provide an explanation to show that the project activity would not have occurred anyway due to at least one of following barriers:

- (a) Investment barrier
- (b) Technological barrier
- (c) Barrier due to prevailing practice
- (d) Other barriers

The additionality demonstration is conducted in the PoA level for this PoA project and it can be considered appropriate because all of CPAs under the PoA are to be developed in the same situation.

The PoA-DD/1/indicates that the *(d) other barriers*” would be mainly used to demonstrate the additionality of CPA001 and PoA-DD/1/ raised the barrier as *other barriers*, that is: Financial Resources and Technical Barrier

In the PoA-DD/1/, PP demonstrated the reason why the proposed project would not be implemented in the absence of the registration of PoA, in other word without revenue based on CER following paragraph 28 of the Simplified Modalities and Procedures for Small-Scale Clean Development Mechanism Project Activities/49/.

The details of the demonstration for the additionality in terms of “*other barriers*” are as follows:

Financial Resources

(1) Demonstration of the background of low penetration rate of SWH (approx. 1 %) /63/:

(a) High upfront cost of SWH (Refer to below (2))

JCI confirmed this view is evidenced by the publication of Energy Research Centre of University of Cape Town, South Africa, titled “Renewable energy technologies for poverty alleviation/65/”

(b) Insufficient financial incentives and lack of consumer awareness (Refer to below (3))

JCI could confirm this situation in the submitted credible evidence/64/.

(2) High upfront SWH cost in comparison with comparable electric geyser

SWH ZAR 12,000 – 35,000

Electric Geyser ZAR 3,000 – 10,000

Above figures are evidenced by the submitted information (SWH prevailing upfront cost /66/ and the recent electric geyser prevailing cost/67/)

(3) Demonstration of lack of traction force of Eskom rebate programme as incentives

- In 2008 South Africa government launched a SWH program via Eskom
 - Programme provides one time subsidy for SWH installation
 - Eskom subsidy is not sufficient to cover all associated costs
- End of 2009, it turned out only less than 5,000 SWH installed, which means falling far

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short of the target (one million SWHs by 2014).

- The result of unpopularity of installing SWH proved that the customers prefer an electric geyser despite of provision of Eskom Rebate Program

JCI considers that above-stated three (3) situations could surely be a barrier caused by financial resources which are properly evidenced respectively.

JCI reviewed above described demonstration of the additionality of the proposed project in consideration of all submitted evidences.

JCI considers that demonstration with the financial barrier in the PoA-DD/1/ is logical and sufficiently evidenced.

In conclusion, the demonstration of additionality can be judged reasonable and acceptable.

9. Monitoring plan

JCI reviewed the monitoring plan presented in the PoA-DD/1/ and CPA-DD/2/ complies with the requirements of the applied methodology (AMS-I.J version 01)/41/. Detailed process of validation is described in the following sections:

1) Parameters to be monitored ex-post

In section E.7.1. and E.7.2. of the PoA-DD/1/ and B.6.1. in the CPA-DD/2/, data and parameters monitored are specified and detailed.

JCI checked these parameters and procedures with the relevant methodology/41/, and confirmed that these parameters and procedures comply with those required to this kind of project.

2) Monitoring of Data/Parameter

In consideration of the requirements above, following monitoring concept and procedures presented in the PoA-DD/1/ and CPA-DD/2/ can be deemed as appropriate because all monitoring items are confirmed in compliance with relevant part of the applied methodology (AMS-I.J)/41/ as clarified below:

1. Concept of the procedure of monitoring

According to the applied methodology, following monitoring procedure is considered as described in the PoA-DD/1/ and CPA-DD/2/:

a) One time monitoring at the time of installation

Following monitoring items are taken up as per CPA-DD

- (1) Collector area (Paragraph 10 (c) (i) of AMS-I.J/41/)
- (2) Tank size (Paragraph 10 (c) (i) of AMS-I.J/41/)
- (3) Household size (Paragraph 10 (c) (i) of AMS-I.J/41/ and equation (34) of POA-DD/1/)
- (4) Type of existing water heating system (Paragraph 9 of AMS-I.J/41/)

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- (5) Confirmation of permanent dismantling of the existing water heating system (Paragraph 10 (c) of AMS-I.J/41/)
 - (6) Confirmation that SWH has successfully passed SABS testing (Paragraph 10 (c) (vi) of AMS-I.J/41/)
 - (7) Residential or commercial application (Paragraph 10 (c) of AMS-I.J/41/)
 - (8) Year-round hot water consumption demand or not (YRD)
 - (9) Tilt and orientation of the SWH (Paragraph 10 (c) (ii) of AMS-I.J/41/)
 - (10) Confirmation that there is no shading on SWH (Paragraph 10 (c) (v) of AMS-I.J/41/)
- b) One time monitoring at the time of the acceptance test
- (1) Confirmation that acceptance test was successfully passed. (Paragraph 9 of AMS-I.J/41/)
- c) Bi annual inspection
- (1) Confirmation that SWH was operational at the time of the inspection (Paragraph 14 of AMS-I.J/41/)
 - (2) Confirmation that SWH complied with maintenance requirements (Paragraph 14 of AMS-I.J/41/)
2. Monitoring organization and monitoring manual
- JCI issued CL-12 for compiling monitoring organization and monitoring manual in the PoA-DD and /or CPA-DD so as to pursue assured implementation of monitoring practices. PP responded as below-stated in the protocol and JCI deemed it appropriate and CL-12 is closed. PP's response in the protocol for CL-12 is as follows:
- Monitoring data is based on a number of key documents that are part of the regular business processes of ETA. In particular, the following documents are used:*
- *Customer Purchase Agreement/77/*
 - *Plumbing Certificate of Compliance/78/*
 - *ESKOM Rebate Form/79/*
- In addition ETA is using data from the following specially created documents:*
- *Supplemental Installation Checklist (provided to verifier)/80/*
 - *SWH System Specs, based on Technical Specifications from Supplier (provided to verifier)/82/*
 - *Bi-annual inspection protocol/81*
- With the exception of the bi-annual inspection all other variables are monitored at the time of installation. The bi-annual inspection establishes the probability that a SWH is operational and with manufacturer-required maintenance procedures. It will first be undertaken in the year 2013. PPs have provided a "Data Management Spread sheet" to the verifier, which demonstrates that the necessary data is indeed available.*
- A detailed monitoring manual will be drawn up in order to describe the monitoring organization.*

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Document forms, agreement, certificate, checklist appeared in the above-mentioned PP's clarification have all been submitted to JCI and JCI confirmed those documents are unable and practical in the monitoring procedures.

Accordingly JCI accepted PP's response as appropriate.

3. Justification of data sampling

As described in the CPA-DD, according to paragraph 14 of AMS I.J/41/, not all of the SWHs have to undergo bi-annual inspection. Instead a sampling approach can be used to determine the percentage of systems operating and in compliance with manufacturer-required maintenance procedures. According to paragraph 15 of AMS I.J/41/ "*when biennial inspection is chosen a 95% confidence interval and 5% margin of error shall be achieved for the sampling parameter*".

A common sampling plan is undertaken for the whole PoA, i.e. the populations of all CPAs are clubbed together, sample size is determined and a single survey is undertaken to collect data. This is justified because the PoA is homogeneous, i.e. has a high degree of standardization across CPAs. The same types of SWHs are installed across all CPAs and the same warranty and maintenance plans are offered. As a result the parameter of interest, the share of SWHs that remains operational and in compliance with the maintenance procedures, is not expected to change over the short or medium term.

In the CPA-DD, it is described that the statistical properties of the sample results are assumed to follow the characteristics of the binominal distribution.

Also, in the CPA-DD, conditions required for the validity of the assumption of a binominal distribution are raised and its justification is clarified.

JCI considers that the above-mentioned approach described in the PoA-DD and CPA-DD is legitimate and acceptable in consideration of the methodology applied, EB's standard/30/, EB's examples/31/, validator's past experiences in similar project in the Republic of South Africa where the proposed project claims as its boundary and commonly acknowledged statistical approach.

In addition, JCI further validate following detailed procedure of determining sample size in terms of identifying the percentage of systems operating described in the CPA-DD.

The needed sample size is determined by the required 95% confidence interval ($\alpha = 0.05$) and the 5% margin of error ($e = 0.05$), where $e = | \theta - p |$ is the absolute value of the difference between the observed probability (p) in the sample and the true probability. The z-value for the 95% confidence interval is $z = 1.96$, according to the table for the binomial distribution.

The confidence interval depends on the probability of success (p) and is determined reliably by the Wilson Score Interval/56/:

$$\{ p + 1 / (2 * n) * z^2 \pm z * [(p * (1 - p)) / n + z^2 / (4 * n^2)]^{(1/2)} \} / (1 + (1 / n) * z^2) < e$$

Where:

p: Observed probability of success (max $p = 0.5$)

n: Sample size

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z: Critical value (= 1.96 for 95% confidence)

e: Maximum error margin (5%)

JCI raised the request of the clarification regarding the justification of applied statistical approach during the discussion in CL-4 in the validation protocol.

PP clarified the background of the selection of the above-said Wilson Score Interval/56/ with evidences/56/.

JCI reviewed the provided evidences/56/ and studied relevant information and technical papers available and judged the selection of selected statistical approach can be justified with reference to the “Standard for sampling and surveys for CDM project activities and programme of activities – EB65 Annex 2”/30/.

As properly shown in the CPA-DD, sample size can be calculated as follows:

p	0.5	0.2	0.1	0.05	0.02	0.01	0.005
N	400	300	200	150	125	100	100
e	4.88%	4.89%	4.94%	4.75%	4.24%	4.45%	4.11%

JCI tried to recalculate to check the contents in the above table and obtained same result.

In the CPA-DD, it is stated that at least 150 randomly chosen SWH will be monitored. If sample size turns out not to be sufficient because the share of failed inspections exceeds 5%, then further random sampling will be done in steps of at least 50 SWH until the required sample size reached.

JCI considers this sort of approach when sample size does not satisfy the required failure rate is quite common and the quantitative procedure is also reasonable.

As stated in the PP’s response to CL-6 raised in the protocol, initial sampling size is chosen 150 which is sufficient for a failure rate of 5% in consideration of paragraph 12 of guideline for sampling of which coverage is 10%/30/.

In addition, it is appropriately explained that SWHs that are not either maintenance-free or covered by a free maintenance program will be sampled separately, since the failure rate (inability to demonstrate compliance with maintenance requirements) is expected to be higher. The sampling size for this group of SWH is 400, which is sufficient for any failure rate. As long as the numbers for such SWHs is small, PPs may choose not to conduct sampling on these SWHs and forego the related emission reductions.

In conclusion, JCI considers that the sampling approach taken in the proposed project is legitimate and meeting to EB’s requirement in the Standard/30/ for sampling.

10. Sustainable development

JCI confirmed that the LoA issued by DNA of the host party/21/; the South Africa confirms the contribution of the proposed CDM project activity to the sustainable development of the host Party, which has been already described in Section IV 1. Approval.

11. Local stakeholder consultation

The stakeholder consultation for CPA-001 has been undertaken by ETA on 21st and 22nd April 2010 by having public participation hearings held in Port Elizabeth Town Hall, the Kabega Primary School and Uitenhage Indoor Sports Centre, where appropriately chosen as venues in consultation with the political leaders of the area as described in the CPA-DD.

Adverts for the above are attached to CPA-DD for CPA-001 as Annex 5.

JCI reviewed the submitted evidences and confirmed that the above-mentioned public hearings as the stakeholders consultation have been conducted as exactly stated in the CPA-DD.

As evidences, following documents were provided in addition to the above adverts:

1. 20 photos of scenes of public hearings/70/
2. Adverts in national and local news papers/71/
3. Agenda showing time schedule, agenda items and presenter/ facilitator/72/
4. Question and answers/73/
5. Register of attendance with personal details/74/
6. SWH Information Hand book prepared for attendance/75/
7. Presentation material/76/

JCI checked the credibility of all of these evidences by reviewing those contents, consistency, etc and concluded that the public stakeholder consultation was truly conducted in a desirable manner. And the result of the stakeholder consultation is not negative according to the description in the CPA-DD/2/.

JCI reviewed the questions and answers raised during the public hearing recorded in the submitted evidences/73/ and confirmed no negative opinion was raised. Therefore the description about the result of stakeholder consultation in the CPA-DD/2/ can be deemed credible.

JCI tried to conduct interview during the on-site audit with two local householders and one householder accepted interview/91/. The house holder who is to be stakeholders in this programme responded in a positive manner. So the validator is quite certain that the programme is welcome among local householders to a considerable degree.

Based on the above, JCI judged that the PoA, basically supported by the majority of local stakeholders, and gave no significant adverse impacts both on social and natural environment, and instead contributed to the improvement of environment and infrastructure.

12. Environmental impacts

The project reduces the consumption of non-renewable natural resources such as fossil fuels as newly installed SWH reduces the electric water heating load. Accordingly there are no significant anticipated negative impacts on the environment and /or on people through this programme.

The installation of a unit on the roof of each household takes only several hours of which environmental effects gained through is not significant. The validator confirmed it with the site observation of real installation of SWH.

Furthermore as described in the section C.3. in CPA-DD/2/, the South African government does not require an EIA or any other assessment (i.e. basic assessment, scoping report) for this type of activities by law and hence an EIA is not required for the measures undertaken under this programme.

JCI confirmed the relevant information in clouding the country's EIA law provided (A Guide to Environmental Impact Assessment (EIA): [http://www.eiatoolkit.ewt.org.za/process/what.html /62/](http://www.eiatoolkit.ewt.org.za/process/what.html/62/)), and considers that the consideration about EIA described in the PoA-DD is appropriate.

13. Comments by Parties, Stakeholder through the consultation process

SSC-PoA-DD version 01 of 30 January 2011, the generic SSC-CPA-DD and specific SSC-CPA-DD were made publicly available on UNFCCC CDM website and Parties, stakeholders and NGOs were through the website invited to provide comments during a 30 days period from 09 July 2011 to 07 August 2011.

And no comments were received.



APPENDIX A: CDM VALIDATION PROTOCOL

(Version 03)

ETA Solar Water Heater Programme in South Africa

1. INTRODUCTION

This document is prepared as the Validation Protocol on ETA Solar Water Heater Programme in South Africa.

The validation protocol is prepared for the following purposes:

- To ensure that, in accordance with the Validation Verification Manual version 01.2 (Annex 1, CDM-EB55, "VVM"), CDM requirements and other relevant guidelines for PoA project issued by EB, these rules are complied with for any project activities requesting registration as a proposed PoA project.
- To ensure a thorough, independent assessment of proposed PoA project submitted for registration as a proposed PoA project activity against the applicable SSC-PoA requirements.
- To assess whether the project design of the proposed PoA project meets the SSC-PoA requirements, using objective evidence, and to assess the completeness and accuracy of the claims and conservativeness of the assumptions made in the project design document.

The validation protocol is consisted of the following two types of tables, which are effective for the purposes of validation above.

TABLE-1 contains the checklist with questions along with the thematic chapter of VVM and other relevant guidelines for PoA project issued by EB.

TABLE-2 shows the corrective actions or clarifications which are requested to be taken in **TABLE-1** and the response from the PP.

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TABLE-2 Resolution of Corrective Actions and Clarification Requests Page 2-1

2. CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

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

➤ **CAR** : a corrective action request (**CAR**) is raised, if one of the following occurs:

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

➤ **CL** : a clarification request (**CL**) is raised,

if information is insufficient or not clear enough to determine whether the applicable SSC-PoA requirements have been met.

➤ **FAR** : a forward action request (**FAR**) is raised,

during validation to highlight issues related to project implementation that require review during the first verification of the project activity.

FARs shall not relate to the SSC-PoA requirements for registration.

The CARs and CLs are resolved or "closed out" only if the project participants modify the project design, rectify the design documents (DDs: PoA-DD, CPA-DDs) or provide adequate additional explanations or evidences that satisfy the requirements. If this is not done, the project activity will not be recommended for registration to the CDM EB.

All CARs, CLs and FARs will be reported on in its validation report. This reporting shall be undertaken in a transparent and unambiguous manner that allows the reader to understand the nature of the issue

Unraised, the nature of the responses provided by the project participants, the means of validation of such responses and clear reference to any resulting changes in the DDs or supporting annexes.


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TABLE-1 REQUIREMENTS CHECKLIST		(OK/No/NA/Tbv)		
No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
1.	Approval	Para.44-50 VVM	--	--
	<Requirement to be validated> All Parties involved shall approve the project activity.	Para.44 VVM	--	--
	The LoA (Letter of Approval) s of all parties involved shall be provided together with its information source and route.			
1.1	The LoA shall confirm that: (a) The Party is a Party to the Kyoto Protocol (b) Participation is voluntary (c) The proposed SSC-PoA project activity contributes to the sustainable development of the country (d) It refers to the precise proposed SSC-PoA project activity title in the SSC-PoA being submitted for registration	Para.45 VVM		CAR-1
2.	Participation	Para.51-54 VVM	--	--
	<Requirement to be validated> Coordinating/managing entity and all other project participants shall be listed in a consistent manner in the project documentation, and their participation in the project activity shall be approved by a Party to the Kyoto Protocol.	Para.51 VVM	--	--
2.1	Coordinating/managing entity and all other project participants shall be listed in tabular form in section A.3 of the SSC-PoA-DD, and this information shall be consistent with the contact details provided in annex 1 of the SSC-PoA-DD.	Para.52 VVM	OK	
1)	The participation of each project participant shall be approved by at least one Party involved, either in a letter of approval or in a separate letter specifically to approve participation.	ditto	OK	
3)	No entities other than those approved as project participants shall be included in these sections of the SSC-PoA-DD.	ditto	OK	
2.2	The approval of participation shall be issued from the relevant DNA.	Para.53 VVM	OK	
	<Requirement to be validated> The CDM Executive Board has provided guidance and procedures for registering a programme of activities (PoA) as a single CDM project activity ⁵² . In validating a PoA and any CDM programme activities (CPAs) proposed to be included in the PoA, the DOE shall, in general, apply the means of validation and reporting requirements described in this Manual. However there are a number of requirements unique to PoAs for which additional instructions are provided below, the precise extent of validation required in each of these areas will need to be determined by the DOE based on the type or PoA being validated. ⁵³ ⁵² See EB 47 report, paragraphs 70 and 72, currently located at < http://cdm.unfccc.int/EB/047/eb47rep.pdf >, for revised guidance and procedures on programmes of activities. ⁵³ See EB 53 report, paragraph 40, currently located at < http://cdm.unfccc.int/EB/053/eb53_rep.pdf > for further information.	Para.165 VVM	--	--


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TABLE-1 REQUIREMENTS CHECKLIST			(OK/No/NA/Tbv)	
No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
2.3	Operational and management arrangements for the PoA	(a)	--	--
(a)	The DOE shall assess the operational and management arrangements which have been established by the coordinating/managing entity in order to determine whether these arrangements are suitable for the PoA being validated.	Para.166	OK	
(b)	The arrangements shall be sufficient to ensure that the coordinating/managing entity will have control of all records and information related to the implementation of individual CPAs and will be in a position to ensure each CPA is being operated in accordance with the specific requirements of the programme.	Para.166	OK	
(c)	Where the DOE considers the arrangements to be unsatisfactory or insufficient a CAR shall be raised and a request for registration shall not be submitted until the CAR has been resolved to the satisfaction of the DOE.	Para.166	OK	
2.4	Eligibility criteria for CPAs			
(a)	The DOE shall assess the specified eligibility criteria in the POA-DD in order to determine whether or not these criteria are sufficient to ensure that all CPAs would comply with the CDM requirements applicable to the PoA, these requirements will include inter alia the means of demonstrating the additionality of the CPA and the applicability of the applied methodology.	Para.167	OK	
(b)	The eligibility criteria represent an essential element of ensuring the smooth functioning or programmatic CDM, therefore the DOE may raise CARs which ensure the ease of application of the eligibility criteria.	Para.167	OK	
2.5	Validation of CPAs			
(a)	The DOE shall assess any proposed CPA, which a coordinating/managing entity wishes to include in the PoA, to determine whether or not it complies with the eligibility criteria specified in the POA-DD.	Para.168	OK	
(b)	The means of validation to determine compliance with this requirement will be specific to the PoA. The DOE may consider a desk review of the documentation sufficient to determine compliance in certain instances and may also consider follow-up interviews and/or site visits necessary for other types of PoA.	Para.168	OK	
	Requirements related to participation in the PoA	EB 55 Annex 38		
2.6	The operators of individual CPAs are not required to be project participants. CDM programme participation is only recorded at the PoA level.	Ditto	OK	
2.7	The coordinating/managing entity shall obtain letters of approval from each host Party and Annex I Party which wishes to be involved in the PoA. Letters of approval shall be issued in accordance with the guidance provided by the Board (EB 16 report, Annex 6).	Ditto	OK	
2.8	The coordinating/managing entity shall obtain letters of authorization of its coordination of the PoA from each host Party.	Ditto	OK	
2.9	The latest version of the "Procedures for modalities of communication between project participants and the Executive Board" shall apply, with the exception that the coordinating/managing entity shall be either sole or joint focal point for each area of communication. The limit of joint focal points for the programme shall be 5, or equal to the number of host Parties if greater than 5.	Ditto	OK	
2.10	If, subsequent to the registration of the programme, the coordinating/managing entity has changed then the DOE who is	Ditto	OK	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	undertaking the next inclusion of a CPA shall submit:			
(a)	New letter(s) of authorization by the each respective host Party stating the change in coordinating/managing entity;	Ditto	OK	
(b)	A confirmation from new coordinating/managing entity that the PoA will be developed and implemented with the same set framework as originally described in the CDM-POA-DD; and	Ditto	OK	
(c)	A validation opinion by a DOE regarding the compliance of the new coordinating/managing entity with the requirements of paragraph 15 (c) below.	Ditto	OK	
3.	Project Design Document	Para.55-57 VVM	--	--
	<Requirement to be validated> The SSC-PoA-DD used as a basis for validation shall be prepared in accordance with the latest template and guidance from the CDM Executive Board available on the UNFCCC CDM website. http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html	Para.55 VVM SSC-PoA-DDs Forms	--	--
3.1	The coordinating/managing entity shall submit to a DOE the following documentation: (a) A completed CDM-POA-DD; (b) A PoA generic CDM-CPA-DD, which specifies the generic information relevant to all CPAs that may be included in the PoA; (c) A completed CDM-CPA-DD which is to be based on the application of the PoA to one real case.	EB 55 Annex 38	OK	
3.2	The SSC-PoA-DD shall be in accordance with the applicable SSC-PoA requirements for completing SSC-PoA-DD. <http://cdm.unfccc.int/Reference/Guidclarif/pdd/index.html>	Para.56 VVM	OK	
3.3	SSC-PoA-DD template shall not be altered, that is, shall be completed using the same font without modifying its format, headings or logo.	SSC-PoA-DD Form	OK	
1)	Tables and their columns shall not be modified or deleted. Rows may be added, as needed. If sections of the CDM-PoA-DD are not applicable, it shall be explicitly stated that the section is left blank on purpose.			
2)	The presentation of values in the SSC-PoA-DD should be international standard format.	SSC-PoA-DD Form & List of standard variables	OK	
3.4	The validation report shall contain a statement regarding the compliance of the SSC-PoA-DD with relevant form. (See guidelines currently located at <http://cdm.unfccc.int/Reference/Guidclarif/pdd/index.html>.)	Para.57	OK	
3.4	The DOE shall make the above documents publicly available on the UNFCCC CDM website in accordance with the latest version of the Procedures for processing and reporting on validation of CDM project activities.	Para.57	OK	
	Preparation of a CDM-POA-DD A coordinating/managing entity shall develop a PoA Design Document (CDM-POA-DD) setting a framework for the implementation of the PoA and unambiguously defining a CPA under the PoA. The CDM-POA-DD shall include the following information:	EB 55 Annex 38		


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
3.5 (a)	Identification of the coordinating/managing entity, host Party(ies) and PoA participants	EB 55 Annex 38	OK	
(b)	Definition of the boundary for the PoA in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all CPAs included in the PoA will be implemented, taking into consideration all applicable national and/or sectoral policies and regulations within that chosen boundary are reflected in the determination of the baseline	EB 55 Annex 38	OK	
(c)	Description of the policy/measure or stated goal that the PoA seeks to promote	EB 55 Annex 38	OK	
(d)	Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity	EB 55 Annex 38	OK	
(e)	Demonstration that in the absence of the CDM either: (i) the proposed voluntary measure would not be implemented, or (ii) the mandatory policy/regulation would be systematically not enforced and that non-compliance with those requirements is widespread in the country/region, or (iii) that the PoA will lead to a greater level of enforcement of the existing mandatory policy /regulation. This shall constitute the demonstration of additionality of the PoA as a whole	EB 55 Annex 38	OK	
(f)	Description of a typical CPA that will be included in the PoA covering the technology or measures to be used, justification of the choice of an approved baseline and monitoring methodology (or combination of approved methodologies) ¹ , application of an approved baseline and monitoring methodology ¹ <i>Such combination will only be allowed once approved in accordance with .Procedures for approval of the application of multiple methodologies to a programme of activities.. If a combination of approved methodologies is being applied this combination must be applied to all CPAs and must be applied in a consistent manner.</i>	EB 55 Annex 38	OK	
(g)	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;	EB 55 Annex 38	OK	
(h)	Starting date and length of the PoA not exceeding 28 years (60 years for A/R);	EB 55 Annex 38	OK	
(i)	Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including a record keeping system for each CPA under the PoA, a system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as CDM project activity or as a CPA of another PoA, the provisions to ensure that those operating the CPA are aware and have agreed that their activity is being subscribed to the PoA;	EB 55 Annex 38	OK	
(j)	Description of a monitoring plan for a CPA, developed in accordance with the approved monitoring methodology, and identification of the monitoring provisions and data parameters a CPA has to apply/monitor;	EB 55 Annex 38		CL-4 CL-6 CL-16
(k)	If the coordinating /managing entity does not wish to have all CPAs verified, a description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA; ²	EB 55 Annex 38		CL-4 CL-6


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	² The Board will develop a guideline containing criteria for determining statistically sound verification techniques and methods. Project developers are requested to take note that programmes which may be registered as a single CDM project activity prior to the adoption of this guideline will be required to comply with such criteria at the point of verification.			
(l)	Environmental analysis of the PoA as per requirements of the CDM modalities and procedures. If this analysis is not undertaken for the PoA but is to be done at the CPA level this shall be described and reflected in the CDM-POA-DD and the CDM-CPA-DD;	EB 55 Annex 38		
(m)	If comments by local stakeholders were invited with regard to the total PoA, information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable. If such comments are to be sought at the CPA level this shall be described and reflected in the CDM-POA-DD and the CDM-CPA-DD;	EB 55 Annex 38		
(n)	In case public funding is used a confirmation that official development assistance is not being diverted to the implementation of the PoA.	EB 55 Annex 38		
3.6	Preparation of the CDM-CPA-DD The coordinating/managing entity shall prepare the PoA specific CDM Programme Activity Design Document (CDM-CPA-DD) ³ using the provisions of the proposed PoA. The template CDMCPA-DD provides for the submission of the following information: ³ The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.	EB 55 Annex 38		
(a)	Geographic reference or other means of identification ⁴ , Name/contact details of the entity/individual responsible for the operation of the CPA; ⁴ For example, in case of stationary CPA geographic reference, in case of mobile CPAs means such as registration number, GPS devices.	EB 55 Annex 38	OK	
(b)	The host Party;	EB 55 Annex 38	OK	
(c)	Starting date, type (fixed or renewable) and duration of the crediting period of the CPA taking into account that the starting date of a crediting period of the CPA shall be the date of its inclusion in the registered PoA or any date thereafter and that the duration of the crediting period shall not exceed the end date of the PoA;	EB 55 Annex 38		CL-15
(d)	Confirmation that the start date of any CPA is not, or will not be, prior to the commencement of validation of the programme of activities, i.e. the date on which the CDM-POA-DD is first published for global stakeholder consultation;	EB 55 Annex 38		CL-15
(e)	Information stipulated in the PoA for use by each CPA to demonstrate how it meets requirements with respect to: (i) Fulfilling the eligibility criteria specified in the CDM-POA-DD, including, as appropriate, the demonstration of the additionality of the CPA; (ii) Calculations of baseline emissions and estimated emission reductions by sources or removal by sinks of greenhouse gases.	EB 55 Annex 38	OK	
(f)	Environmental analysis as per requirements of the CDM modalities and procedures, unless the analysis may be undertaken for the whole PoA as reflected in the CDM-POA-DD;	EB 55 Annex 38	OK	
(g)	Information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken	EB 55 Annex 38	OK	


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	of any comments received, as applicable unless the comments may be sought for the whole PoA as reflected in the CDM-POA-DD;			
(h)	Confirmation that the CPA is neither registered as a CDM project activity nor included in another registered PoA.	EB 55 Annex 38	OK	
4.	Project Description	Para.58-64 VVM	--	--
	<Requirement to be validated> The SSC-PoA-DD shall contain a clear description of the project activity that provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation.	Para.58 VVM	--	--
4.1	In section A.2 of the SSC-PoA-DD the following description shall be included: - the purpose of the project activity; - explain how the proposed project activity reduces greenhouse gas emissions (i.e. what type of technology is being employed, what measures are undertaken as part of the project activity, etc); - the view of the project participants on the contribution of the project activity to sustainable development (max. one page)	SSC-PoA-DD Form	OK	
4.2	In section A.4.2 of SSC-PoA-DD, followings are to be described; 1. Technology or measures to be employed by the SSC-CPA 2. Eligibility criteria for inclusion of a SSC-CPA in the PoA	ditto	OK	
4.3	In section A.4.3 of SSC-PoA-DD, "Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality)" shall be described.	ditto	OK	
4.4	In section A.4.4 of the SSC-PoA-DD, operational, management and monitoring plan for the programme of activities(PoA) shall be described. In case public funding from Parties included in Annex I to the Convention is involved, it shall be necessary to provide in Annex 2 information on sources of public funding for the project activity from Parties included in Annex I providing an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.	ditto	OK	
4.5	In section A.4.5 of the SSC-PoA-DD, It shall be described In case public funding from Parties included in Annex I to the Convention is involved, it shall be necessary to provide in Annex 2 information on sources of public funding for the project activity from Parties included in Annex I providing an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.	ditto	OK	
4.6	The DOE shall determine whether a proposed SSC-PoA project activity meets the requirements of the simplified modalities and procedures for small-scale CDM project activities. (See decision 4/CMP.1, annex II.)	Para.134	OK	
4.7	During its validation of a SSC-PoA project activity, the DOE shall confirm that: (a) The project activity qualifies within the thresholds of the three possible types of small scale project activities. It may include more	Para.135		CL-4 CL-6



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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	<p>than one component; for example, a type III methane recovery component activity and a type I electricity component activity; (See CDM EB 28 report, paragraphs 56 and 57, currently located at <http://cdm.unfccc.int/EB/028/eb28rep.pdf> for guidance on size limits for the components.)</p> <p>(b) The project activity conforms to one of the approved small-scale categories and applies the relevant tool or methodology. The DOE shall confirm that the small-scale methodologies are applied in conjunction with the general guidance to the methodologies, which provides guidance on equipment capacity, equipment performance, sampling and other monitoring-related issues;</p> <p>(Small-scale project activities that follow the simplified modalities and procedures for small-scale CDM project activities may not apply a large-scale approved methodology. However, a project activity that is within the small scale project activity thresholds may apply a large-scale approved methodology if it follows the modalities and procedures for large-scale project activities defined in footnote 1 above.)</p> <p>(The latest versions are located at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.</p> <p>In the EB 44 report, paragraph 49, currently located at <http://cdm.unfccc.int/EB/044/eb44rep.pdf>, Board clarified that the header of SSC methodologies stating .Project participants shall take into account the general guidance to the methodologies, information on additionality, abbreviations and general guidance on leakage provided at the same link mentioned above, which also implies attachment C of appendix B <http://cdm.unfccc.int/methodologies/SSCmethodologies/history/c_leak_biomass/guid_biomass_v03.pdf> is to be applied in conjunction with a SSC methodology <i>mutatis mutandis</i>.)</p> <p>(See EB 50 report, paragraph 51 and its annex 30, .General guidelines for sampling and surveys for small scale CDM project activities., currently located at <http://cdm.unfccc.int/EB/050/eb50_repan30.pdf> for sampling guidance. In accordance with the CDM EB 44 report, paragraph 50, currently located at <http://cdm.unfccc.int/EB/044/eb44rep.pdf>, leakage from equipment transfer from within to outside the project boundary may be excluded from consideration in SSC methodologies.)</p> <p>(c) The project activity is not a debundled component of a large-scale project, in accordance with the rules defined in appendix C of the simplified modalities and procedures for small-scale CDM project activities; (See EB 36, annex 27. Compendium of guidance on the debundling for SSC project activities., currently located at <http://cdm.unfccc.int/EB/036/eb36_repan27.pdf>, and the EB 46 report, paragraph 60, currently located at <http://cdm.unfccc.int/EB/046/eb46rep.pdf> for further clarification on determining the occurrence of debundling do not require the consideration of the start date of the proposed CDM project.)</p>			


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	(d) Whether an assessment of the environmental impacts of the proposed SSC-PoA project activity is required by the host Party.			
4.7-1	In assessing the additionality of SSC-PoA CDM project activities, the DOE shall refer to the specific requirements on demonstration of additionality for small scale project activities in chapter V, section E, subsection 6740 and may refer to the .Non-binding best practice examples to demonstrate additionality for SSC project activities. (See decision 3/CMP.1, annex, appendix B, attachment A for small-scale CDM project activities.) (See EB35, annex 34, currently located at < http://cdm.unfccc.int/EB/035/eb35_repan34.pdf >.)	Para.136	OK	
4.8	If the DOE does not undertake a physical site inspection, it shall be appropriately justified.	Para.62 VVM	NA (On-site inspection was carried out)	
4.9	If the proposed SSC-PoA project activity involves the alteration of an existing installation or process, Does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	Para.63 VVM	NA	
5.	Baseline and monitoring methodology	Para.65-92 VVM	--	--
(a)	General requirement	Para.65-67 VVM	--	--
	The baseline and monitoring methodologies selected by the project participants shall comply with the methodologies previously approved by the CDM Executive Board.	Para.65 VVM	--	--
	To ensure that the project activity meets this general requirement, the followings shall be confirmed. (a) The selected methodology is applicable to the project activity; (b) The PP has correctly applied the selected methodology.	Para.66 VVM	--	--
	It shall also be ensured that the selected methodology is applicable to the project activity and has been correctly applied with respect to the followings: (a) Project boundary (b) Baseline identification (c) Algorithms and/or formulae used to determine emission reductions (d) Additionality (e) Monitoring methodology	Para.67 VVM	--	--
(b)	Applicability of the selected methodology to the project activity	Para.68-76 VVM	--	--
	<Requirement to be validated> The selected baseline and monitoring methodology previously approved by the CDM Executive Board shall be validated to be applicable to the project activity.	Para.68 VVM	--	--


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
5.1	<p>In section E.1 of the SSC-PoA-DD, refer to the UNFCCC CDM web site for the most recent list of the small-scale CDM project activity categories contained in Appendix B. The number and the version of the approved methodology that is used (e.g. "Version 17 of AMS-I.C.") shall be indicated. The methodology shall be ensured to be correctly quoted and applied by comparing it with the actual text of the applicable version of the methodology available on the UNFCCC CDM website.</p> <p>Referring to the UNFCCC CDM web site for the title and reference list as well as the details of approved baseline methodologies, the following contents shall be indicated in section E.1 of the PoA-DD.</p> <ul style="list-style-type: none"> the approved methodology the version of the methodology that is used any methodologies or tools which the approved methodology draws upon and their version 	SSC-PoA-DD Form Para.69 VVM	OK	
5.2	The choice of methodology shall be justified and the project participants shall show that the project activity meets each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein in section E.2 of the SSC-PoA-DD.	Para.70 VVM	OK	
2)	The documentation referred to in the SSC-PoA-DD and its content shall be correctly quoted and interpreted in the DD.	ditto	OK	
5.3	<p>In section E.1 and E.2 of SSC-PoA-DD, the choice of project type and category (hereafter referred to as "project category") for the proposed project activity shall be justified. It shall be demonstrated that the project activity qualifies as a small-scale project activity and that it will remain under the limits of small-scale project activity types during every year of the crediting period:</p> <p>For Type I : Demonstrate that the capacity of the proposed project activity will not exceed 15 MW (or an appropriate equivalent),</p> <p>For Type II: Demonstrate that the annual energy savings on account of efficiency improvements will not exceed 60 GWh (or an appropriate equivalent) in any year of the crediting period,</p> <p>For Type III: Demonstrate that the estimated emission reductions of the project activity will not exceed 60 ktCO₂e in any year of the crediting period.</p>	SSC-PoA-DD Form	OK	
(c)	Project boundary	Para.77-79 VM	--	--
	<p><Requirement to be validated></p> <p>The SSC-PoA-DD shall correctly describe the project boundary, including the physical delineation of the each CPA included within the project boundary for the purpose of calculating project and baseline emissions for the proposed SSC-PoA project activity.</p>	Para.77 VVM	--	--
5.4	In section B.3 of the SSC-PoA-DD,			
1)	<p>the project boundary of SSC-CPAs based on the guidance of the applicable project category shall be defined.</p> <p>The delineation in the SSC-PoA-DD of the project boundary shall be correct and meet the requirements of the selected baseline methodology, which shall also be demonstrated by documented evidence and corroborated by a site visit.</p>	Para.78 VVM	OK	
2)	All emission sources and GHGs required by the methodology shall be included within the project boundary for the purpose of calculating project emissions and baseline emissions.	Para.78 VVM	OK	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
3)	If the methodology allows project participants to choose whether a source or gas is to be included within the project boundary, the project participants shall justify the choice by supporting documented evidences.	ditto	OK	
(d)	Baseline identification	Para.80-87 VVM	--	--
	<Requirement to be validated> The SSC-PoA-DD shall identify the baseline for the proposed SSC-PoA project, defined as the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed PoA project.	Para.80 VVM	--	--
	Any procedure contained in the methodology to identify the most reasonable baseline scenario, shall be correctly applied. If the selected methodology requires use of tools (such as the “Tool for the demonstration and assessment of additionality” and the “Combined tool to identify the baseline scenario and demonstrate additionality”) to establish the baseline scenario, the methodology on the application of these tools shall be confirmed. In such cases, the guidance in the methodology shall supersede the tool. The each step in the procedure described in the PoA-DD against the requirements of the methodology shall be checked.	Para.81 VVM	--	--
5.5	In section E.4 of the SSC-PoA-DD, the baseline for the proposed project activity with reference to the chosen project category shall be specified. The key assumptions and rationale shall be explained and justified. It shall be required to illustrate in a transparent manner all data used to determine the baseline emissions (variables, parameters, data sources etc.) preferably in a tabular form	SSC-PoA-DD Form		CL-16
5.6	If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, it shall be determined whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario has been excluded.	Para.82 VVM	NA	
5.7	It shall be determined whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the PoA-DD.	Para.83 VVM	OK	
	The documents and sources referred to in the PoA-DD shall be correctly quoted and interpreted. All data used to determine the baseline scenario shall be illustrated in a transparent manner, preferably in a table form.	ditto	OK	
5.8	All applicable PoA requirements shall be taken into account in the identification of the baseline scenario for the proposed PoA project activity, including “relevant national and/or sectoral policies and circumstances.” (See paragraph 45 CDM M&P; Annex 3 to the report of the meeting of the CDM EB22 < http://cdm.unfccc.int/EB/022/eb22rep.pdf >.) (See decision 3/CMP.1, annex, paragraph 45, currently located at < http://cdmunfccc.int/Reference/COPMOP/08a01.pdf#page=6 >, and EB22, annex 3, “Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios”, currently located at < http://cdm.unfccc.int/EB/022/eb22_repan3.pdf >.)	Para.84 VVM Para.45 CDM/M&P Annex 3 EB22	OK	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
5.9	The SSC-PoA-DD shall provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity.	Para.85 VVM	OK	
(e)	Algorithms and/or formulae used to determine emission reductions	Para.88-92 VVM	--	--
	<Requirement to be validated> The steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions shall comply with the requirements of the selected baseline and monitoring methodology.	Para.88 VVM	--	--
5.10	The equations and parameters in the SSC-PoA-DD and CPA-DD shall be correctly applied by comparing them to those in the selected approved methodology.	Para.89 VVM		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11 CL-14 CL-16
	If the methodology provides for selection between different options for equations or parameters, adequate justification shall be provided (based on the choice of the baseline scenario, context of the project activity and other evidence) and the correct equations and parameters shall be used, in accordance with the methodology selected.	ditto		CL-16
5.11	The justification shall be given in the SSC-PoA-DD and CPA-DD for the choice of data and parameters used in the equations.	Para.90 VVM		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11 CL-16
	If data and parameters will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remain fixed throughout the crediting period, it shall be demonstrated that all data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity and will result in a conservative estimate of the emission reductions.	ditto		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11 CL-14
	If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, it shall be demonstrated that the estimates provided in the SSC-PoA-DD for these data and parameters are reasonable.	ditto		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11
5.12	In section B.6.1 of the SSC-PoA-DD, Explain how the procedures, in the approved project category to calculate project emissions, baseline emissions, leakage emissions and emission reductions are applied to the proposed project activity. Clearly state which equations will be used in calculating emission reductions.	SSC-PDD Form		CL-1 CL-3 CL-7 CL-8 CL-10



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TABLE-1 REQUIREMENTS CHECKLIST				(OK/No/NA/TV)
No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	<p>Explain and justify all relevant methodological choices, including:</p> <ul style="list-style-type: none"> • where the category provides different options to choose from (e.g. "combined margin" under AMS I.D); • where the category provides for different default values (e.g. values for MCF under AMS III.E) 			CL-11 CL-14
5.13	<p>In section E.6.2 of the SSC-PoA-DD, This section shall include a compilation of the data and parameters NOT monitored but determined upfront so as to be available for validation. Data from monitoring (e.g. measurements after the implementation of the project activity) should not be included here but in the table in section E.7.1. This may includes data that is measured, if relevant with sample thereof, and data that is collected from sources such as official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature.</p> <p>Data that is calculated with equations provided in the approved category or default values specified in the category should not be included in the compilation.</p> <p>Provide for each parameter the chosen value or, where relevant, the qualitative information, using the table provided below. Particularly:</p> <ul style="list-style-type: none"> -Provide the actual value applied. Where time series of data is used, where several measurements are undertaken or where surveys have been conducted, provide detailed information in Annex 3. -Explain and justify the choice for the source of data. Provide clear and transparent references or additional documentation in Annex 3. -Where values have been measured, include a description of the measurement methods and procedures that comply with the guidance provided under general guidance to indicative small scale methodologies found on the UNFCCC CDM website (e.g. which standards have been used), indicate the responsible person / entity having undertaken the measurement, the date of measurement(s) and the measurement results. <p>More detailed information can be provided in Annex 3 of SSC-PoA-DD.</p>	ditto		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11 CL-14
5.14	<p>In section E.6.2 of the SSC-PoA-DD, Provide 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.</p> <p>Document how each equation is applied, in a manner that enables the reader to reproduce the calculation. Where relevant, provide additional background information and or data in Annex 3, including relevant electronic files (i.e. spreadsheets).</p> <p>If the project activity involves more than one component activity (e.g. one component activity for methane capture applying AMS III.D together with another component for grid connected electricity generation applying AMS I.D) emission reduction calculations for each of the component shall be provided separately in a transparent manner.</p>	ditto		CL-1 CL-3 CL-7 CL-8 CL-10 CL-11 CL-14
5.15	<p>In section A.4.4. of the SSC-CPA-DD, Summarize the results of the ex-ante estimation of emission reductions for all years of the crediting period according to the SSC-CPA-DD Form. Each CPA-DD shall have a respective summary table</p>	ditto		CL-1 CL-3 CL-14


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	for the results of ex-ante estimation of emission reductions of all crediting period. A table showing the aggregate emission reductions of the project activity shall also be included.			
6.	Additionality of a typical CPA of PoA	Para.93-120 VVM	--	--
	<Requirement to be validated> The SSC-PoA-DD shall describe how a proposed CDM project activity is additional. In accordance with decision 3/CMP.1,annex, paragraph 43 “A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity” (see decision 5/CMP.1, annex paragraph 18). While specific elements of the assessment of additionality are discussed in further detail in paragraphs 97-120 in VVM, not all elements discussed below will be applicable to all CPAs included in PoA project activities.	Para.93 VVM Para.43 CDM/M&P	--	--
(a)	Prior consideration of the clean development mechanism While specific elements of the assessment of additionality are discussed in further detail in Section 6.3 –6.15 below, not all elements discussed below will be applicable to all proposed CDM project activities	Para.97-103 VVM	--	--
	<Requirement to be validated> If the PoA start date is prior to the date of publication of the SSC-PoA-DD for stakeholder comments it shall be demonstrated that the CDM benefits were considered necessary in the decision to undertake the project as a proposed CDM project activity.	Para.97 VVM	--	--
6.1	The start date of the project activity, reported in the SSC-PoA-DD, shall be in accordance with the “Glossary of CDM terms”. http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM_v03.pdf Glossary of CDM terms Version 05	Para.98 VVM		CL-2
	The starting date of a PoA is the date on which the implementation or construction or real action of a project activity begins. In section B.1 of the SSC-PoA-DD, the description should contain not only the date, but also a description of how this start date has been determined, and a description of the evidence available to support this start date.	ditto		CL-2
	In particular, for project activities that require construction, retrofit or other modifications, the date of commissioning cannot be considered the project activity start date.	ditto		CL-2
6.2	It shall be identified whether it is a new project activity (a project activity with a start date on or after 02 August 2008) in accordance with the guidance from the CDM Executive Board, or an existing project activity (a project activity with a start date before 02 August 2008) (See Annex 46 of EB 41 report : Guidance on the Demonstration and Assessment of Prior Consideration of the CDM)	Para.99 VVM Annex 46 EB41		CL-2
6.3	For a new project activity, for which PoA-DD has not been published for global stakeholder consultation or a new methodology proposed to the CDM Executive Board before the project activity start date, the DOE shall ensure by means of confirmation from the UNFCCC secretariat that PPs had informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. If such a notification has not been provided by the project participants within six months of the project activity start date, the DOE shall determine that the CDM was not seriously considered in the decision to implement the project activity. (See EB 48, annex 62, .Prior consideration of the CDM form, currently	Para.100 VVM		CL-2


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	located at < https://cdm.unfccc.int/EB/048/eb48_repan62.pdf >, for the standardized form.			
6.4	For an existing project activity, for which the start date is prior to the date of publication of the PoA-DD for global stakeholder consultation, the project participant's prior consideration of the CDM shall be demonstrated by providing the following evidence (preferably official, legal and/or other corporate). In such cases the PP shall provide an implementation timeline of the project in the SSC-PoA-DD.	Para.101 VVM	OK	
(a)	Evidence to indicate awareness of the CDM prior to the project activity start date and evidence to indicate that the benefits of the CDM were a decisive factor in the decision to proceed with the project shall be provided.	ditto	OK	
	Evidence to support this would include, inter alia, minutes and/or notes related to the consideration of the decision by the Board of Directors, or equivalent, of the project participant, to undertake the project as a proposed CDM project activity.	ditto	OK	
(b)	Reliable evidence that must indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation.	ditto	OK	
	Evidence to support this should include, inter alia, <ul style="list-style-type: none"> contracts with consultants for CDM/DDs/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), Evidence of agreements or negotiations with a DOE for validation services, Submission of a new methodology to the CDM Executive Board, Publication in newspaper, Interviews with DNA, Earlier correspondence on the project with the DNA or the UNFCCC secretariat. 	ditto	OK	
6.	Additionality of each CPA included in the PoA	Para.93-120 VVM	--	--
(b)	Identification of alternatives	Para.104-106 VVM	--	--
	<Requirement to be validated> The SSC-PoA-DD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required.	Para.104 VVM	--	--
6.5	The list of alternatives shall includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity;	Para.105 VVM	OK	
(a)				
(b)	The list shall contains all plausible alternatives that are considered, on the basis of local and sectoral knowledge, to be viable means of supplying the outputs or services that are to be supplied by the proposed PoA project activity.	ditto	OK	
(c)	The alternatives shall comply with all applicable and enforced legislation.	ditto	OK	
6.6	In section E.5 of the SSC-PoA-DD, Demonstrate that the proposed project activity is additional as per options provided under attachment A to Appendix B of the simplified	SSC-PoA-DD Form	OK	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	<p>modalities and procedures for small-scale CDM project activities. National policies and circumstances relevant to the baseline of the proposed project activity shall be summarized here.</p> <p>Attachment A to Appendix B Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:</p> <p>(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;</p> <p>(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;</p> <p>(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;</p> <p>(d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.</p>			
(c)	Investment analysis	Para.107-113 VVM	--	--
	<p><Requirement to be validated> If investment analysis has been used to demonstrate the additionality of the proposed PoA project, the PoA-DD shall provide evidence that the proposed PoA project would not be: The most economically or financially attractive alternative; or Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).</p>	Para.107 VVM	--	--
6.7	<p>Project participants can show this through one of the following approaches, by demonstrating that:</p> <p>It should be noted that the EB 39, annex35 paragraph 14 "Guidance on the assessment of investment analysis", currently located at <http://cdm.unfccc.int/EB/039/eb39_repan35.pdf> and the requirements of specific methodologies may preclude the use of one of these options in certain scenarios.</p>	<p>Para.108 VVM</p> <p>Annex 35 EB39</p>	--	--
(a)	Demonstrate that the proposed CDM project activity would produce no financial or economic benefits other than CDM-related income. Document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;	ditto	NA	
(b)	The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative;	ditto	NA	
(c)	Financial returns of the proposed CDM project activity would be insufficient to justify the required investment.	ditto	NA	
6.8	<p>The DOE shall comply with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM Executive Board and with other relevant guidance including the latest guidelines on plant load factors "guidelines for the reporting and validation of plant load factors"</p> <p>(See EB 48 report, annex 11, currently located at <http://cdm.unfccc.int/EB/048/eb48_repan11.pdf>.)</p>	<p>Para.109 VVM</p> <p>Annex 58 EB51</p>	--	--



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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
6.9	Project participants should provide spreadsheet versions of all investment analysis. All formulas used in this analysis are readable and all relevant cells be viewable and unprotected.	Annex 45 EB41	NA	
1)	The evidences on which input values in the investment analysis are based shall be provided.	ditto	NA	
2)				
6.10	All parameters and assumptions used in calculating the relevant financial indicator shall be validated thoroughly, and the accuracy and suitability of these parameters shall be verified using the available evidence and expertise in relevant accounting practices.	Para.110 VVM	NA	
1)				
2)	Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.	Annex 45 EB41	NA	
3)	The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of project IRR.	Annex 45 EB41	NA	
4)	In the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM the investment analysis should reflect the economic decision making context at point of the decision to recommence the project. Therefore capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets.	ditto	NA	
5)	Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PoA-DD and be reproducible in the associated spreadsheets.. Where a variable which constitute less than 20% has a material impact on the analysis, this variable shall be included in the sensitivity analysis. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances.	ditto	NA	
6)	Such evidence for the evaluation of investment analysis as invoices, receipts, price indices, feasibility reports, public announcements, audited actual project cost and annual financial reports shall be provided upon request of the DOE.	ditto	NA	
6.11	The suitability of any benchmark applied in the investment analysis:	Para.111 VVM	--	--
1)	In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for an equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.	Annex 45 EB41	NA	
2)	If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If	ditto	NA	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate.			
3)	The effectiveness of the applied benchmark shall be demonstrated with appropriate evidence.	ditto	NA	
4)	The PPs shall demonstrate that it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, showing previous investment decisions by themselves involved and demonstrating that the same benchmark has been applied, or if there are verifiable circumstances that have led to a change in the benchmark.	Para.111 VVM	NA	
6.12	The CDM Executive Board clarified that in cases where project participants rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activities, it is required to ensure that: (See the EB 38 report, paragraph 54, currently located at < http://cdm.unfccc.int/EB/028/eb28rep.pdf >.)	Para.112 VVM Para.54 EB38		
(a)	The period of time between the finalization of the FSR and the investment decision shall be sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed;	ditto	NA	
(b)	The values used in the PoA-DD and associated annexes shall be fully consistent with the FSR, and where inconsistencies occur the appropriateness of the values shall be explained.	ditto	NA	
(c)	It shall be confirmed that the input values from the FSR are valid and applicable at the time of the investment decision.	ditto	NA	
(d)	Barrier analysis (In case applied for Technological barrier, Barrier due to prevailing practice and Other barriers) Barriers are issues in project implementation that could prevent a potential investor from pursuing the implementation of the proposed project activity. The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity undertaken without being registered as a CDM project activity.	Para.114-117 VVM	--	--
6.13	<Requirement to be validated> If barrier analysis has been used to demonstrate the additionality of the proposed PoA project, the PoA-DD shall demonstrate that the proposed PoA project faces barriers as below.	Para.114 VVM	--	--
	(a) Prevent the implementation of this type of proposed PoA project; (See EB 50, annex 13 .guidelines for objective demonstration and assessment of barriers, currently located at < http://cdm.unfccc.int/EB/050/eb50_repan13.pdf >. (b) Do not prevent the implementation of at least one of the alternatives.	Para.114 VVM	NA	
6.14	Issues that have a clear direct impact on the financial returns of the project activity cannot be considered barriers and shall be assessed by investment analysis. This does not refer to either (a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance, or (b) Barriers related to the unavailability of sources of finance for the project activity.	Para.115 VVM	NA	


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No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
6.15	The available evidence shall be provided and/or interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) shall be arranged to demonstrate that the barriers listed in the PoA-DD exist.	Para.116 VVM	NA	
(a)				
(b)	The existence of barriers shall be substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics.	ditto	NA	
7.	Monitoring plan	Para.121- 123 VVM	--	--
	<Requirement to be validated> The PoA-DD shall include a monitoring plan. This monitoring plan shall be based on the approved monitoring methodology applied to the proposed CDM project activity.	Para.121 VVM	--	--
7.1	<u>Compliance of the monitoring plan with the approved methodology</u>			CL-4 CL-5 CL-6 CL-9 CL-12 CL-16
1)	(i) The list of parameters required by the selected approved methodology shall be identified.	Para.122 VVM		
	(ii) The monitoring plan shall contain all necessary parameters, and the means of monitoring described in the plan shall comply with the requirements of the methodology;	ditto		CL-4 CL-5 CL-6 CL-9 CL-12
2)	In the section B.7 of the SSC-PoA-DD, The following two sections (E.7.1 and E.7.2) shall provide a detailed description of the monitoring plan, including an identification of the data to be monitored and the procedures that will be applied during monitoring. Please note that data monitored and required for verification and issuance are to be kept for a minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.	SSC-PDD Form		CL-4 CL-5 CL-6 CL-9 CL-12
3)	In section E.7.1 of the SSC-PoA-DD, Data that becomes available only after validation of the project activity (e.g. measurements after the implementation of the project activity) should be included here. Provide for each parameter the following information, using the table shown in the SSC-CDM Guidelines: <ul style="list-style-type: none"> The source(s) of data that will be actually used for the proposed project activity (e.g. which exact national statistics, actual measurement etc.). Where the parameters are to be measured in accordance with the guidance of the approved project category or the general guidance to the indicative methodologies, specify the measurement methods and procedures including accepted industry standards or national or international standards which will be applied, which measurement equipment is used, how the measurement is undertaken, which calibration procedures are applied, what is the accuracy of the measurement method, who is the responsible person / entity that should undertake the measurements and what is the measurement interval. A description of the QA/QC procedures (if any) that should be applied. Where relevant: any further comment. 	ditto		CL-4 CL-5 CL-6 CL-9 CL-12


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	Provide any relevant further background documentation in Annex 4 .			
4)	In section E.7.2 of the SSC-PoA-DD, Please provide a detailed description of the monitoring plan. Describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects generated by the project activity. Clearly indicate the responsibilities for and institutional arrangements for data collection and archiving. The monitoring plan should reflect good monitoring practice appropriate to the type of project activity. Provide any relevant further background information in Annex 4 .	ditto		CL-4 CL-5 CL-6 CL-9 CL-12
5)	In section B.8 of the SSC-PoA-DD, Please provide date of completion of the application of the methodology to the project activity in <i>DD/MM/YYYY</i> Please provide contact information of the persons(s)/entity(ies) responsible for the application of the baseline and monitoring methodology to the project activity and indicate if the person/entity is also a project participant listed in Annex 1 .	ditto		CL-4 CL-5 CL-6 CL-9 CL-12
6)	<u>Implementation of the plan</u> (i) The monitoring arrangements described in the monitoring plan shall be feasible within the project design;	Para.122 VVM		CL-4 CL-5 CL-6 CL-12
	(ii) The means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, shall be sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.	ditto		CL-4 CL-5 CL-6 CL-12
8.	Sustainable development	Para.124- 126 VVM	--	--
	<Requirement to be validated> CDM project activities shall assist Parties not included in Annex I to the Convention in achieving sustainable development.	Para.124 VVM	--	--
8.1	The letter of approval by the DNA of the host Party shall confirm the contribution of the proposed CDM project activity to the sustainable development of the host Party.	Para.125 VVM	OK	
9.	Local stakeholder consultation	Para.127- 129 VVM	--	--
	<Requirement to be validated> Local stakeholders shall be invited by the PPs to comment on the proposed CDM project activity prior to the publication of the DDs on the UNFCCC website. See glossary of CDM terms, currently located at < http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM_v03.pdf >, for definition of stakeholders.	Para.127 VVM Glossary of CDM terms	--	--
9.1	Comments by local stakeholders that can reasonably be considered relevant for the proposed PoA project shall be invited in an open and transparent manner.	Para.128 VVM	OK	
(a)	The summary of the comments received as provided in the PoA-DD shall be complete.	ditto	OK	
(b)	The project participants shall demonstrate that they have taken due account of any comments received and shall describe/explain this process in the PoA-DD.	ditto	OK	
(c)				
10.	Environmental impacts	Para.130- 132 VVM	--	--


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TABLE-1 REQUIREMENTS CHECKLIST		(OK/No/NA/Tbv)		
No.	Requirement	Refer. Para. VVM	Check Comment	ID. No.
	<Requirement to be validated> Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity in accordance with paragraph 37(c) of the CDM modalities and procedures.	Para.130 VVM Para.37(c) CDM/M&P	--	--
10.1	Project participants shall submit documentation to the DOE on the analysis of the environmental impacts of the project activity	Para.130 VVM	OK	
10.2	Project participants shall also provide all references to support documentation of a EIA if required by the host Party	Para.131 VVM	OK	
11.	Additional Validation Requirement for a Programme of Activities (PoA)	EB 55 Annex 38		
	<Requirement to be validated> In addition to the validation requirements arising out of the modalities and procedures for a clean development mechanism, the validation by the DOE shall address the following issues:	Para.165 VVM	--	--
(a)	Additionality of the PoA (3.5 (e) above);	EB 55 Annex 38	OK	
(b)	Eligibility criteria for inclusion of a proposed CPA in the registered PoA, including criteria to be used for demonstration of additionality of a CPA;	ditto	OK	
(c)	Operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA inter alia the issues identified in paragraph 3.5 (i) above;	ditto	OK	
(d)	Consistency between CDM-POA-DD and the PoA generic CDM-CPA-DD to be used for inclusion of a CPA in the registered PoA;	ditto	OK	
(e)	In cases where more than one approved methodology will be applied to each CPA, confirmation that the application of multiple methodologies has been approved in accordance with .Procedures for approval of the application of multiple methodologies to a programme of activities.	ditto	OK	


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CA R	Corrective Action Requests			
CAR -1	Letters of approval by the DNAs of South Africa and Finland are to be provided.	1.1	<p>The South African DNA only issues Letters of Approval once they have received a draft validation report.</p> <p>The project already has a Letter of no objection from the South African DNA. However, the letter needs to be changed in order to account for the name change of the project owner from CEF Sustainability to ETA Energy. PPs have requested the name change, which is currently being processed by the DNA: The original Letter has been provided to the validation team. The amended Letter of no Objection will be provided to the validation team once it is available.</p> <p>Response 2: Final approval after application to the South African DNA and submission of the final validated PDD should not exceed 45 working days.</p> <p>Response 3: SA LoA and LoAs by Annex I country (Finland) have all been provided.</p>	<p>JCI received no objection letter from South African DNA.</p> <p>JCI noted the LoA of south African government will be issued after submission of the draft validation report.</p> <p>DVR will be available at the end of this month at the latest.</p> <p>Response 2 is acknowledged.</p> <p>JCI confirmed the receipt of all required LoAs in response 3.</p> <p>CAR-1 is closed.</p>
CL	Clarification Requests			


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-1	It is required to reconsider the procedure of calculation of emission factor for grid based electricity referring to the applied "Tool" and relevant methodology.	5.10 5.11 5.12 5.13 5.14 5.15	<p>The grid emission factor calculation is in line with the procedure outlined in the methodology</p> <p>According to paragraph 9 of AMS-I.J. "Emission reductions are calculated as the energy savings that result from the project implementation multiplied by an emission factor for the electricity and/or fossil fuel displaced. For calculating the emission factor for displaced fossil fuels, reliable local or national data shall be used. IPCC default values shall be used only when country or project specific data are documented to be either not available or not reliable. For the emission factor for displaced electricity, an annual emission factor shall be calculated, in accordance with the provisions in AMS-I.D "Grid connected renewable electricity generation" (tCO₂/MWh)."</p> <p>According to paragraph 12 of AMS-I.D "The Emission Factor can be calculated in a transparent and conservative manner as follows:</p> <p>(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.</p> <p>OR</p> <p>(b) The weighted average emissions (in t CO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used."</p> <p>AMS I.D offers a free choice between option (a) and option (b). In section E.6.1 of the PoA-DD option (a) was chosen, i.e. the emission factor was calculated as a combined margin emission factor according to the Tool.</p> <p>Calculating the combined margin emission factor and in particular the build margin emission factor according to the Tool is also feasible, despite the fact that many of South Africa's power plants are relatively old. In particular step 5 of the Tool was correctly applied:</p> <p>In step 5 of the Tool, option 1 is applied, i.e. the ex-ante option.</p> <p>(a) SET_{5-units}: The five most recently built power plants have been selected as: Kendal (1988), Majuba (1996), Ankerlig (2007), Gourikwa (2007) and Palmiet (1988).</p> <p>(b) SET_{...}: The annual electricity generation of the project electricity system</p>	<p>JCI reviewed the response and the clarification provided is deemed fully acceptable.</p> <p>Therefore CL-1 is closed.</p>


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No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>This approach is in line with the methodological choices of the most recently registered small scale CDM projects. Since 2008 there have been three small-scale CDM projects registered that calculate emission factors according to AMS I.D. All three of them used the CM approach to calculate the Grid Emission factor. The project names and registration numbers are given below:</p> <ul style="list-style-type: none"> • 2549: Alton Landfill Gas to Energy Project • 2692: Bethlehem Hydroelectric project • 1665: Kanhym Farm manure to energy project <p>PPs acknowledge that for the small-scale PoA “SASSA Low Pressure Solar Water Heater Programme” option (b) was chosen, however this does not diminish the legitimacy of choosing option (a).</p> <p>As a supporting document PPs are submitting a spreadsheet “Supporting Spreadsheet Approach to Emission Factor Calculation in SSC Projects” which contains the details of the three projects and the one PoA mentioned above.</p>	
CL-2	It is required to make it clear whether the starting date is in compliance with the UNFCCC’s definition of the starting date as it states in the PoA simply that it is the date when the Board of CEF approved the pilot phase of the PoA.	6.1 6.2 6.3	<p>According to the CDM Glossary of Terms the starting date of the PoA is the earliest date at which either the implementation or construction or real action of a project activity begins.</p> <p>The starting date for the PoA is 24/02/2010. This is the date when the Board of the Central Energy Fund (CEF) approved the pilot phase of the PoA and allocated funds to the project team (ETA). CEF is the mother company of ETA. This approval shows the time when the project participant was committed to real action, as the release of the ZAR10 million was for the rollout of the first 500 SWHs. From that point on ETA incurred expenses, large and small, for the implementation of the pilot phase of the project.</p>	<p>JCI confirmed the submitted “Extract from minutes of board meeting held on 24 February 2010 at CEF house - - -”.</p> <p>It should be trusted, however JCI would request PP to submit the original formal minutes issued at the date of 24 February 2010 as more credible evidence.</p>


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>An electronic copy of the “<u>Extract from Board minutes</u>” is provided to the validation team as a supporting document.</p> <p>The PDD has been updated accordingly.</p> <p>Response 2:</p> <p>The original formal minutes issued at the date of 24 February 2010 has been submitted.</p>	<p>If the original minutes are confidential to DOE, it would be also acceptable to submit the only relevant sheet such as front sheet, date and signature sheet and sheet stating the same fact in the extract above.</p> <p>The revised description in the section B.1. in the PoA is deemed appropriate.</p> <p>JCI confirmed the submission of the formal minutes as evidence.</p> <p>Therefore CL-2 is closed.</p>


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-3	<p>It is required to clarify the source (e.g. EB approved methodology or tool) of equations in E.6.2. in PoA.</p> <p>In particular, definitions for TDL, $A_{i,corr}$, etc are required based on the convincing sources for better understanding.</p>	<p>5.10</p> <p>5.11</p> <p>5.12</p> <p>5.13</p> <p>5.14</p> <p>5.15</p>	<p>TDL: Paragraph 11 of AMS-I.J states that, “Displaced electricity can include technical grid losses (transmission and distribution) for the grid serving the locations where the project SWH system(s) are installed. 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 10% shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.”</p> <p>In section E.6.3 the value of 8.25% is based on published figures by the national utility ESKOM in the annual report for 2011. (Eskom Holdings Limited Integrated Report 2011, Customer Network Business, Distribution division p. 186. The document has been provided to the validation team in electronic form. It is also available at the following websites: http://financialresults.co.za/2011/eskom_ar2011/ http://www.eskom.co.za/c/84/annual-report/ http://www.eskom.co.za/live/click.php?u=http%3A%2F%2Ffinancialresults.co.za%2F2011%2Feskom_ar2011%2Findex.php&o=Item%2B600&v=990da8</p> <p>$A_{i,corr}$: The actual collector area A_i is corrected in order to ensure conservativeness in line with the requirements of AMS I.J, in particular applicability condition (iii) and (iv) on page 5 of the methodology. In section E.6.2 explanations have been added why the equations for $A_{i,corr}$ and $A_{i,demand}$ have been set up as is. In section E.7.1 of the PoA-DD, tables have been added for $A_{i,corr}$ and $A_{i,demand}$.</p>	<p>JCI confirmed that PP applies the methodological procedure in AMS-I.J. in conjunction with the assumption of “transmission and distribution losses - TDL” referring to the response provided in the left column.</p> <p>Also JCI acknowledges that the justification of the value of 8.25% for TDL is credible in confirmation of the provided ESKOM's annual report.</p> <p>As for A_i, $A_{i,corr}$ and $A_{i,demand}$, the clarification by PP is deemed understandable in consideration of the requirement of the applied methodology.</p> <p>Therefore CL-3 is closed.</p>


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-4	<p>It is required to review the calculation formula for sample size 'n' in E.7.2. of PoA.</p> <p>Figures of 'n' in the Table 5 cannot be obtained by substituting given figures.</p>	<p>3.5 (j), (k)</p> <p>4.7</p> <p>7.1</p> <p>1), 2), 3), 4), 5), 6)</p>	<p>A different more reliable confidence interval has been chosen. The Wilson Score Interval provides more reliable results than the Normal Approximation Interval. As a result the calculation of the sample size has been changed.</p> <p>The PoA-DD has been changed accordingly.</p> <p>Response 2:</p> <p>The weaknesses of the Normal Approximation Interval are most pronounced when failure rates are very low. Given that the failure rate is expected to be very low (perhaps less than 1%) during the period covered by the warranty and maintenance plan, the Wilson Score Interval was chosen to address this weakness effectively. PPs are interested in accuracy of the results, which directly affect the emission reduction calculation. PPs also would like to preempt any questions at the stage of ITR or CDM-EB.</p> <p>Please also note that a common sampling plan is undertaken for the whole PoA, i.e. the populations of all CPAs are clubbed together, sample size is determined and a single survey is undertaken to collect data. This is justified because the PoA is homogeneous, i.e. has a high degree of standardization across CPAs. The same types of SWHs are installed across all CPAs and the same warranty and maintenance plans are offered. As a result the parameter of interest, the share of SWHs that remains operational and in compliance with the maintenance procedures, is not expected to change over the short or medium term. The conditions of the draft standard for sampling and surveys for CDM Project Activities and Programme of Activities (paragraphs 18-22) are met.</p>	<p>JCI noted that PP chose a different confidence interval, the Wilson Score Interval.</p> <p>JCI carefully studied the Wilson Score Interval based on the information provided in the footnote of the PoA-DD and confirmed that the sampling size is rightly figured out based on the applied statistical sampling approach.</p> <p>However JCI would request PP to elaborate more about the reason why the statistical approach has been changed because the sampling size becomes larger, which means more cost burden for PP.</p> <p>PP's Response 2 here is understandable and sufficient as clarification. Therefore CL-4 is closed.</p>


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No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>See the following document: http://cdm.unfccc.int/public_inputs/2011/eb63_05/draft_standard_sampling.pdf</p> <p>The PoA-DD and the CPA-DD have been changed accordingly.</p>	
CL-5	It is required to clarify the definition of the binominal distribution. Is the intended procedure a normal approximation of binominal distribution?	7.1 1), 2), 3), 4), 5), 6)	<p>A different more reliable confidence interval has been chosen. The Wilson Score Interval provides more reliable results than the Normal Approximation Interval.</p> <p>The PoA-DD has been changed accordingly.</p>	The applied statistical approach instead of the previous one is the Wilson Score Interval and its definition is clear according to the provided information. Therefore CL-5 is closed.
CL-6	It is required to justify the threshold value of 3% and incremental further sampling of 25 in the case of excessive failure rate in E.7.2. of PoA.	3.5(j), (k) 4.7 7.1 1), 2), 3), 4), 5), 6)	<p>Since the POA offers participating households a free warranty and maintenance program during the first 6 years of operation, the cases where SWHs no longer work or are not well-maintained are expected to be rare. SWHs that have technical problems will be repaired quickly. The initial sampling size of 150 SWHs is therefore chosen to be sufficient for a failure rate of 5%.</p> <p>In the event that the sample size is insufficient due to a higher-than-expected failure rate additional data collection (incremental further sampling) is performed in accordance with paragraph 12 of the Guidelines on Sampling. Collecting data on an additional 50 SWHs would be sufficient to cover failure rates of up to 10%.</p> <p>SWHs that are not either maintenance-free or covered by a free maintenance</p>	<p>JCI understood that the clarification is based on the different approach in terms of statistics for calculation of sampling size.</p> <p>In consideration of newly applied statistical approach and sampling size, and procedure in case of higher rate of failure is deemed acceptable.</p> <p>Therefore CL-6 is closed.</p>


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>program will be sampled separately, since the failure rate (inability to demonstrate compliance with maintenance requirements) is expected to be higher. The sampling size for this group of SWH is 400, which is sufficient for any failure rate. As long as the numbers for such SWHs is small, PPs may choose not to conduct sampling on these SWHs and forego the related emission reductions.</p> <p>The PoA-DD has been changed accordingly.</p>	
CL-7	It is required to clarify the installation schedule and other associated procedure in the CPA in conjunction with the estimation process of annual estimation of emission reduction shown in A.4.4.	5.10 5.11 5.12 5.13 5.14	<p>The latest installation schedule for CPA001 is found below:</p> <p>2011 - 250 2012 – 500 2013 – 6 000 2014 – 12 000 2015 – 1 250</p> <p>Total 20 000</p> <p>An official letter from ETA will be provided to the validation team as a supporting document.</p> <p>The emission reduction calculation has been changed accordingly and also in A.4.4.</p> <p>Response 2:</p> <p>The projection figures have been revised slightly as a result of the successful pilot in NMBM. The figures in the projection now line up with the number of SWH included in the first CPA. Please note that the number of SWHs to be included into the first CPA is adjusted to 18 000. The revised projection</p>	<p>JCI confirmed the installation schedule of SWH for CPA001 with the submitted letter.</p> <p>The figures listed in the left column are not consistent with those in the said letter. Further clarification is required.</p> <p>JCI confirmed PP's Response 2 with provided installation schedule and the relevant formal letter as evidences.</p> <p>Therefore CL-7 is closed.</p>


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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion												
			figures from ETA are as follows: <table><tr><td>Year</td><td>Units</td></tr><tr><td>2011</td><td>250</td></tr><tr><td>2012</td><td>2000</td></tr><tr><td>2013</td><td>6000</td></tr><tr><td>2014</td><td>9750</td></tr><tr><td>Total</td><td>18000</td></tr></table>	Year	Units	2011	250	2012	2000	2013	6000	2014	9750	Total	18000	
Year	Units															
2011	250															
2012	2000															
2013	6000															
2014	9750															
Total	18000															
CL-8	It is required , if appropriate, to refer to Q-factor in demonstrating the conservativeness in terms of emission reduction with applying AMS-I.J.	5.10 5.11 5.12 5.13 5.14	<p>The expected average Q-Factor for the 14 SWH systems that were awarded the tender for supplying the program is 8.85 MJ/m2, According to AMS I.J stipulated energy savings are 450 kWh / m² per year or 4.438 MJ / m² per day. The two numbers are not directly comparable. Energy production by the SWHs is somewhat higher than the stipulated energy savings, since the SWHs are also consuming energy, for example for electric pumps. If one assumes, in order to be conservative, that energy consumption by the project amounts to one-third of the energy production, then energy production would be 6.66 MJ/m2 under the stipulated energy savings method. This is lower than the Q-factor for any of the SWH types included in the PoA and much lower than the average Q-factor. As a result, the stipulated savings method is clearly the more conservative approach.</p> <p>PPs have provided a supporting spreadsheet. The sheet “SWH System Specs” is included in the Excel-document “Emission Reduction Calculation”. It shows how the average Q-factor was calculated.</p>	<p>It is requested, if PP thinks it is appropriate, to include the clarification here in the PoA-DD.</p> <p>However JCI cannot identify the spreadsheet showing how the average Q-factor is calculated.</p> <p>Would you please provide it again?</p> <p>JCI confirmed the provided Data Management spreadsheet how average Q-factor is calculated.</p> <p>Therefore CL-8 is closed.</p>												



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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-9	It is required to clarify more explicitly how it is possible to avoid double counting in A.4.4.2. of PoA in consideration of the feature of the structure of database in the monitoring plan.	7.1 1), 2), 3), 4), 5), 6)	<p>When a SWH is entered into the PoA database it is checked that the serial number of the SWH, the installation address and the name of the owner are not already included in the PoA database. As a result, double-counting of individual SWHs is avoided. At the time of verification the DOE can check the overall database to crosscheck that there are not two SWHs with the same serial number or at the same address.</p> <p>The above information has been added to section A.4.4.1 of the PoA-DD.</p> <p>PPs have provided a supporting spreadsheet to the validation team. The sheet "POA Database" provides an overview of the variables captured in the database, the data sources and the data entry options. At present no SWHs have been entered into the database. PPs will provide an updated, partially filled-in version of the sheet in order to demonstrate that the necessary data is readily available.</p> <p>PPs is proposing to do sampling at the PoA-level, which is explicitly allowed for homogeneous PoAs with small sub-measures under the draft "STANDARD FOR SAMPLING AND SURVEYS FOR CDM PROJECT ACTIVITIES AND PROGRAMME OF ACTIVITIES", which is currently undergoing a call for input.</p> <p>As argued in section E.7.2 of the PoA-DD, the probability of a successful inspection is likely to be very similar across SWHs, due to the existence of a 10-year warranty and 6-year maintenance plans. The similarity is not limited to within a CPA but can plausibly be expected across CPAs as well.</p>	The clarification is deemed acceptable. Therefore CL-9 is closed.



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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-10	In conjunction with the installation schedule detailed in the submitted excel sheet of which title is “CPA001-NMBM_Emission Reduction Calculation_15OCT2011”, the average collector area is calculated 3.08m2 based on the following assumption:	5.10	The derivation of the average area was done in the emission reduction calculation spreadsheet.	PO’s response does not meet to the request.
		5.11		
		5.12	It was based on the idea that we have the following distribution:	Following clarification is required with evidence:
		5.13	300l: 50%	1. Justification of shares assumed, that is, why the 50% share of 300l can be justified. Objective source of such assumption is requested.
		5.14	200l: 25%	
			150l: 25%	
			This forecast has been revised by the PP and is included in the ETA projections letter. The new figures are:	
			300L: 75%	
			200L: 15%	
			150L: 10%	
		The 250L systems were left out of the projections as the PP deemed the projected uptake of this size system to be negligible.	2. There are many SWH specs provided and collector area is not same even for same capacity.	
		It was also based on the statement that the area varies between 1.8m2 and 4m2. The area was then set for a 150l-SWH system to equal 1,8m2 and for a 300l-SWH to 4m2.	Please identify which spec is based for respective capacity.	
		We now have better data (SWH System Specs) for the collector areas. The average area is now based on the statement that the area varies between 1.8m2 and 4.2m2. Using straight averages within each tank size yields:	And also, justification of such averaging approach based on representative value is requested.	
		300L = 4 m ²		
		250L = 3.77 m ²		
		200L = 2.15 m ²		
		150L = 2.05 m ²	The background of above request is that there seems a SWH of which capacity is 300l and aperture area is 2.1m2 (Genergy) among	



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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion																								
			<p>1. The source of the data is the forecast by ETA management as presented in the letter provided. The forecast in turn is based on the results of the pilot programme. Please note that in response to the pilot programme ETA management has revised its forecast towards a higher percentage of 300l-systems:</p> <p>300L: 75%</p> <p>200L: 15%</p> <p>150L: 10%</p> <p>The results of the pilot programme are as follows:</p> <table><tr><th>System Capacity</th><th>Number</th><th>Percentage</th></tr><tr><td></td><td></td><td></td></tr><tr><td>150 L</td><td>48</td><td>25.7%</td></tr><tr><td>250 L</td><td>35</td><td>18.7%</td></tr><tr><td>300 L</td><td>102</td><td>54.5%</td></tr><tr><td>200 L</td><td>2</td><td>1.1%</td></tr><tr><td></td><td></td><td></td></tr><tr><td>Total</td><td>187</td><td>100%</td></tr></table> <p>It is apparent that the latest forecast deviates somewhat from the distribution in the pilot programme. Demand for the 300L and the 200L is higher than in the pilot, and demand for the 250L and 150L systems is lower than in the pilot. For the ex-ante calculation of emission reductions, PPs have chosen to</p>	System Capacity	Number	Percentage				150 L	48	25.7%	250 L	35	18.7%	300 L	102	54.5%	200 L	2	1.1%				Total	187	100%	<p>specs provided in data management spread sheet provided as an evidence.</p> <p>In response 3, PP's clarification is well-evidenced and rational.</p> <p>JCI understand the clarification with reference to the revised "Data Management Spreadsheet", and confirmed the consistency between excel sheet each other.</p> <p>Therefore CL-10 is closed.</p>
System Capacity	Number	Percentage																										
150 L	48	25.7%																										
250 L	35	18.7%																										
300 L	102	54.5%																										
200 L	2	1.1%																										
Total	187	100%																										



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TABLE-2 Resolution of Corrective Actions and Clarification Requests

No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>use the actual distribution from the pilot programme in order to ensure conservativeness.</p> <p>Please note that the above calculation affects only the ex-ante calculation. The actual emission reductions are calculated based on the collector areas of the SWHs that are actually installed.</p> <p>2.</p> <p>The latest version of the page "SWH System Specs" is now included in both the data management spreadsheet and also the emission reduction calculation spreadsheet. The collector area for each of the SWH types as well as the other data are based on the original technical specifications documents.</p> <p>Please note that the collector area of the Genergy 150L is actually 2.01m². For the Genergy 250L and the Genergy 300L systems it is actually 4.02m². Moreover, the collector area for the Pow-a-mate 250L system is actually 4m². This is because, like the Genergy 250L and 300L systems, it uses two plates to provide enough heating energy for the 250 liters of water. The corrections have been made to the "SWH System Specs" spreadsheet.</p> <p>Under the averaging approach the average collector area for each tank size is calculated as the average across all systems of this size. For example there are two 300L systems, Genergy and Afrilanga/Malrams, with areas of 4.02 m² and 3.8 m², respectively. The average of 3.91 m² is used as the average collector area for the 300L systems. In a second step the weighted average, with percentage shares from the pilot used as weights, across the different tank sizes (150L, 200L, 250L, and 300L) is taken in order to calculate the average area for a SWH in the CPA. The details of the calculations can be seen in the CPA001 Emission Reduction Calculation</p>	


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No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>spreadsheet, page "Calculation of Average Area". The resulting values are as follows:</p> <p>300L = 3.91 m² 250L = 3.95 m² 200L = 2.19 m² 150L = 2.00 m²</p>	
CL-11	<p>As for the ESy calculation formula: $ESy = \sum f \cdot \{A \cdot (YRD \cdot 450 + (1 - YRD) \cdot 300)\}$ in DDs, however in excel sheet for ER calculation, I (=95%) is included.</p> <p>Please clarify why "I" is deleted in DDs.</p> <p>Also, in the same formula, please justify why the value of "f" contributes conservativeness.</p>	5.10 5.11 5.12 5.13 5.14	<p>The relevant formulas in the PoA-DD and the CPA-DD were revised in order to be consistent with the emission reduction calculation spreadsheet. The probabilities $P_{plan,y}$ (for SWH that are either maintenance-free or covered by a maintenance plan) and $P_{noplan,y}$ (by SWH that require maintenance and are not covered by a maintenance plan) that a SWH is operating and in compliance with manufacturer-required maintenance procedures have been included in the calculation of ESy.</p> <p>For the purposes of the ex-ante emission reduction calculation $P_{plan,y}$ has been set equal to 95% and $P_{noplan,y}$ has been set equal to 50%. The ex-ante emission reduction calculation is based on the fact that during the first six years all the SWHs are covered by a maintenance plan. Beyond the first six years it is assumed that 50% of the SWHs are maintenance-free. This is conservative since the most popular models made by Genergy are maintenance-free. The details of the calculation are included in the "Emission Reduction Calculation" spreadsheet.</p> <p>$f_{i,y}$ is the fraction of the year y, for which SWH_i was operational. For the ex-ante emission reduction calculation the following values are applied: 100%, if SWH is already installed at the beginning of year y</p>	<p>JCI recognized the revised calculation procedure can be said more accurate and conservative.</p> <p>Therefore CL-11 is closed.</p>


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No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
			<p>40%, if SWH is installed during year y</p> <p>The 40% reflects that SWHs that are installed during year y contribute energy savings only for a portion of the year. 50% could be used as a default given that it is unknown in advance at what time during the year the SWH will be installed. 40% has been chosen in order to ensure conservativeness.</p>	
CL-12	<p>It is requested to clarify about the monitoring organization.</p> <p>PoA-DD and/or CPA-DD may be required to describe about how monitoring is conducted.</p> <p>In addition, monitoring manual is to be drawn up.</p>	<p>7.1 1), 2), 3), 4), 5), 6)</p>	<p>Monitoring data is based on a number of key documents that are part of the regular business processes of ETA. In particular, the following documents are used:</p> <ul style="list-style-type: none"> • Customer Purchase Agreement • Plumbing Certificate of Compliance • ESKOM Rebate Form <p>In addition ETA is using data from the following specially created documents:</p> <ul style="list-style-type: none"> • Supplemental Installation Checklist (provided to verifier) • SWH System Specs, based on Technical Specifications from Supplier (provided to verifier) • Bi-annual inspection protocol <p>With the exception of the bi-annual inspection all other variables are monitored at the time of installation. The bi-annual inspection establishes the probability that a SWH is operational and with manufacturer-required maintenance procedures. It will first be undertaken in the year 2013.</p> <p>PPs have provided a "Data Management Spreadsheet" to the verifier, which demonstrates that the necessary data is indeed available.</p> <p>A detailed monitoring manual will be drawn up in order to describe the monitoring organization.</p>	<p>PP's response is understandable.</p> <p>JCI considers the procedure clarified is practically functionable.</p> <p>Therefore CL-12 is closed.</p>


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No. CAR, CL	Clarifications and corrective action requests by validation team	Sec. No. in TABLE -1	Summary of project owner response	Validation team Conclusion
CL-13	As for the maintenance interval, it is stated that Each SWH is covered by a 10-year warranty and 6-year maintenance plan or maintenance free in the PoA-DD. It is required to clarify more detailed explanation.	5.10 5.11 5.12 5.13 5.14	The maintenance plan and warranty referred to in the POA-DD are valid, but will most likely not matter. In the initial tender requests it was stated that the SWH's should come with the warranty and maintenance plan. As it stands now the most distributed SWH's are the ones that are maintenance free. These being the GENERGY systems. The maintenance plans shown in the data sheet are consistent with the 6 year maintenance plans and show the maintenance steps required in that 6 year period for the individual system.	JCI confirmed PP's clarification. CL-13 is closed.
CL-14	The justification that 99% of installed SWH is for primary residence is required.	5.10 5.11 5.12 5.13 5.14	The justification is that the PoA is directed towards households that are primary residences. The typical secondary residences are vacation homes and for temporary demand the installation of SWH is just not as economically attractive as the savings are small. As a result almost all the SWH will be installed in primary residences, even though there may be some odd secondary residences. The 99% figure for primary residences is a conservative assumption for the emission reduction calculation.	The clarification by PP can be deemed reasonable and JCI accepted. CL-14 is closed.
CL-15	The CPA starting date is not to be before GSC. GSC date is 09/07/2011- 07/08/2011 and the actual installation of SWH is to be after that date. Please submit the evidence of the date of first installation of SWH for CPA001is after	3.6 (c) 3.6 (d)	We have changed the starting date of the CPA 001 to the first installation date after the end of the GSC process date 07/08/2011. To this end, we have submitted the ESKOM rebate form for an installation done on 10/08/2011 to demonstrate that 10/08/2011 is the beginning of CPA001.	The starting date of CPA-001 is revised correctly. JCI confirmed that the revised date is consistent to the submitted evidence. CL-15 is closed.




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	09/07/2011.			
CL-16	The equation number of (2a), (2b) appearing in the Parameter sheet in PoA-DD (page36, 37) are wrong.	5.5 5.10 5.11 7.1 1)	The equation numbers have been changed in the POA-DD accordingly. It should be (32a), (32b) referring to their definition on page 28 of PoA-DD. The relevant description in the PoA-DD was revised accordingly.	JCI confirmed the revision was rightly made. CL-16 is closed.
FA R	Forward Requests	Action		
FAR-1	None	--	--	

APPENDIX B**Certificate of Appointment of Validation Team**

Project Title	ETA Solar Water Heater Programme in South Africa
Applied Methodology	AMS-I.J., Version 1.0 Sectoral Scope 1
Date: July 08, 2011	
Designated Operational Entity: Japan Consulting Institute (JCI)	
<p>Reflecting the competence criteria of JCI, this is to certify the appointment of validation team of JCI specified below for the CDM project activity above, as per CDM Project Activity Registration Form, "F-CDM-REG" adopted at the 24th Meeting of CDM Executive Board, and Validation Procedure established by JCI CDM Center.</p>	
<p>Signature  Akio Yoshida, Executive Director, JCI CDM Center</p>	
Date: July 08, 2011	
Client: CEF Carbon (Pty) Ltd	
<p>Reflecting the curricula vitae provided, this is to agree the validation team of JCI specified below for the CDM project activity above, as per Validation Procedure established by JCI CDM Center.</p> <p>It is also agreed that Mr. Mutsuo KATO of JCI participates in the validation activities of the said project for the quality issues under its quality management scheme.</p>	
<p>Signature  (Name) CT COOPER (Title) ACTING CEO CEF CARBON</p>	

Validation Team

Validation Team	Name	Assigned Role
Leader	Masaki OKADA	All relevant issues
Member	Shigeo AOKI	CDM auditor

Technical Reviewer	Moritaka KATO	Energy Industries and Manufacturing Industries
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