Verification and Certification Report

First periodic verification

Report for:

Orb Energy Private Limited
JP Morgan Ventures Energy Corporation

Verification of GS-VER project for

Orb Energy Solar Project, India
(Ref: GS 696)

Monitoring Period:

12/09/2010 to 31/12/2012

LRQA Reference	:	GS-MUM-0061968 version 03
Date	:	15/11/2013
Work carried out by	:	Archak Pattanaik Ankush Jain Arnab Deb Natarajan G
Work verified by	:	T Ramesh Dr. Dhirayuth Chenvidhaya Michiaki Chiba

LRQA
Business Assurance

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1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by JP Morgan Ventures Energy Corporation, representing the project participants (PP), to undertake the first periodic verification of the registered project activity "Orb Energy Solar Project, India" Gold Standard (GS) project reference number 696 covering the monitoring period from 12/09/2010 to 31/12/2012. The verification has been performed by document review based on the Monitoring Report Version 1 dated 14/07/2013, on-site assessment and interviews with the stakeholders, resolution of outstanding issues and issuance of the verification report.

The project is installation of solar Photo Voltaic (PV) and Solar thermal systems in the Karnataka state of India. The project reduces the greenhouse gas (GHG) emissions by substituting conventional fossil fuels and grid electricity by installation of solar Photo Voltaic (PV) and Solar thermal systems.

The fulfilment of the Gold Standard requirements (Version 2.2) and latest version of CDM Validation and Verification Standard has been evaluated and the conformance to the verification requirements was confirmed based on the given information. A risk based approach was taken to conduct the verification, and corrective action requests (CARs), clarifications (CLs) and forward action requests (FARs) were issued for relevant actions by the PP.

The verification team identified, through the verification process, 3 CARs and 3 CLs. The PP has taken actions and submitted to LRQA the revised monitoring report and supporting evidence. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period are correctly calculated in the monitoring report Version 3.1 dated 01/11/2013 based on the approved monitoring methodology and the monitoring plan of the registered PDD. Therefore LRQA certifies the emission reductions amounting to 18,573 tCO_2e and requests the Gold Standard to issue the GS-VERs.

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Abbreviations

AC	Alternating Current
AQL	Acceptance Quality Level
CAR	Corrective action request
CDM	Clean Development Mechanism
CDM-EB	Executive Board of Clean Development Mechanism
CDM M&P	Modalities and procedures for a clean development mechanism
CDM VVS	CDM Validation and Verification Standard
CER	Certified Emission Reduction
CL	Clarification
DC	Direct Current
ERs	Emission reductions
FAR	Forward action request
GHG	Greenhouse gas
GS	Gold Standard
GS VER	GS Voluntary Emission Reduction
IPCC	Intergovernmental panel on climate change
LR	Lloyd's Register
LRQA	Lloyd's Register Quality Assurance Limited
LTPD	Lot Tolerance Per-cent Defective
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project design document
PP	Project participant
QA/QC	Quality Assurance/Quality Control
SD	Sustainable Development
SHS	Solar Home System
SPV	Solar Photo Voltaic
SWH	Solar Water Heating System
tCO_2e	Tonne of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
UQL	Unacceptance Quality Level

2 Introduction

The project participant (PP) represented by JP Morgan Ventures Energy Corporation has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake the first periodic verification of the proposed project activity "Orb Energy Solar Project, India" covering the monitoring period from 12/09/2010 to 31/12/2012. This report summarises the findings through the verification process that has been conducted on the Gold Standard (GS) requirements, Version 2.2 and latest version of CDM Validation and Verification Standard.

The verification has been undertaken by the team formed of the qualified personnel of LRQA as follows:

Archak Pattanaik	LRQA India	Team Leader, GHG Lead Verifier, GS Expert
Ankush Jain	LRQA India	Team Member, GHG Verifier, GS Expert
Arnab Deb	LRQA India	Team Member, GHG Verifier
Natarajan G	External Expert	Sector Expert
T Ramesh	LRQA India	Technical Reviewer, GHG Lead Verifier, GS Expert
Dr. Dhirayuth Chenvidhaya	External expert	Sector Expert
Michiaki Chiba	LRQA Ltd	Decision Maker

Personnel being engaged in Gold Standard project verification are qualified based on the established procedures of LRQA to assure the resource requirements that satisfy all the requirements of competence criteria of the Gold Standard and CDM accreditation standard for operational entities. LRQA is designated as an operational entity and holds the full responsibility on decision-making regarding the verification in accordance with the accreditation requirements of the GS. The certificate of appointment of the team personnel is attached to this report.

2.1 Objective

Through the verification activities, the verification team was to confirm that:

1) the project activity has been implemented and operated as described in the validated and registered PDD and that all physical features of the project activity are in place

2) the monitoring report (MR) and other supporting documents provided are complete and verifiable, and in accordance with applicable CDM requirements

3) actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan (MP) and the approved methodology; and

4) the data is recorded and stored as per the monitoring methodology.

The verification followed the requirements of the current version of the CDM Validation and Verification Standard (CDM VVS) to ensure the quality and consistency of the verification work and the report.

2.2 Scope

The scope of verification was an independent and objective review of the monitored emission reductions (ERs) against the GS requirements. LRQA followed a risk-based approach in the verification, focusing on the identification of significant risks for implementation of the registered monitoring plan and the resultant emission reductions. The verification statement shall become final after final review by the decision maker of LRQA Ltd.

2.3 GHG Project Description

Project title	Orb Energy Solar Project, India
Gold Standard reference	GS 696
CDM reference (if applicable)	Not applicable
Date of registration	12/09/2012
Applied methodology	AMS.I.A, Version 14 AMS.I.C, Version 19
Project type	Small-scale
Crediting period	12/09/2010 – 11/09/2017
Project location	Karnataka, India
Project participants	Orb Energy Private Limited JP Morgan Ventures Energy Corporation
Monitoring period	12/09/2010 to 31/12/2012
Gold Standard rules	Gold Standard, Version 2.0

3 Methodology

3.1 Verification approach

LRQA's verification of the project documentation provided by the project participant was based on both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted to LRQA. Qualitative information is made up of the information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emission reports, and review and internal audit of calculations.

As well as the monitoring documentation provided by the project participants, LRQA also reviewed:

a) the registered PDD, GS Passport and the monitoring plan, including any approved revised monitoring plan and/or changes from the registered PDD, GS Passport and the corresponding validation report

b) previous verification reports, if any

c) the applied monitoring methodology

d) relevant decisions, clarifications and guidance from the CMP and the GS Board

e) any other information and references relevant to the project's resulting emissions reductions.

3.2 Desk review

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included:

1) a review of data and information presented to verify their completeness

2) a review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the Quality Assurance/Quality Control (QA/QC) procedures, and

3) an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report version 1 dated 14/07/2013 was initially reviewed and LRQA requested the PP to present the supporting information and documents and such additional information and documents that were also reviewed by LRQA. The documents reviewed by LRQA are listed in Appendix A.

Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by LRQA. The documents reviewed by LRQA are listed in Appendix A. LRQA reviewed the final version of the monitoring report version 3.1 dated 01/11/2013 to confirm that all changes agreed had been incorporated.

3.3 On-site assessment

An on-site assessment was conducted as a part of verification activity and involved:

1) an assessment of the implementation and operation of the GS project activity as per the registered PDD

2) a review of information flows for generating, aggregating and reporting of the monitoring parameters

3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP

4) a cross-check between information provided in the MR and data from other sources

5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology

6) A review of calculations and assumptions made in determining the GHG data and ERs, and

7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

8) Sampling of data and information as defined in the verification on-site plan.

The detail of the on-site assessment is as follows:

Date	Location	Team Members on site	Subjects covered	Persons interviewed
26/08/2013	Orb Energy office, Bengaluru	Archak Pattanaik, Arnab Deb, Natarajan G	1. Introduction 2. Objectives of the audit 3. Review of Orb energy systems 4. Review of baseline survey 5. Review of monitoring survey 6. Record checking of sales and installation data 7. Record checking of employee database 8. Discussion on QA/QC of the systems 9. Review of maintenance system 10. Review of battery disposal system 11. Discussion on audit plan and samples to be checked 12. Visit of households located in outskirts of Bengaluru and interviews with households	Damian Miller, Chief Executive Officer, Orb Energy N P Ramesh, Chief Operating Officer, Orb Energy Rohit Lohia, Climate Secure
27-29/08/2013	Orb energy site offices and installation sites in Karnataka	Archak Pattanaik, Arnab Deb, Natarajan G	1. Introduction with stake holders 2. Confirming unique number of installation 3. Confirming technical specification of installation 4. Discussion on data management and reporting, and QA/QC system 5. Confirmation on employment at branch offices 6. Confirmation on preventive maintenance 7. Records of employment at	Customers, Orb Energy R. Pravash, CM Veeraswamy, Prabhakar, Dr Mahantesh GH, Balachandran AS, Nagaraj, Mangula MC Shrigiri GP Emmed Shreelaxmi J Abhilash MS Vijay Jyothi TS TS Sumangla MI Koiyol Shibagappa MD Paty

			branch offices 8. Record checking of preventive maintenance 9. Records of disposal of battery system 10. Any other issue identified	Hemavati Naveen Technicians, Orb Energy: Appaji G Prashant Kumar CM Hamumanthaiah Mohammad Zafar, Sales Manager, Orb Energy
30/08/2013	Orb Energy office, Bengaluru	Archak Pattanaik, Arnab Deb, Natarajan G	1. Introduction 2. Outcome of the onsite assessment 3. Issues identified during onsite assessment, if any 4. Discussion on findings 5. Discussion on further timelines 6. Any other issues identified during onsite assessment 7. Closing meeting	Mamtha, Customer Care executive, Orb Energy Nagaraj DB, General Manager, Human Resources, Orb Energy Balachandra MP, General Manager – Supply & Logistics, Orb Energy K Thyagaran, General Manager _ Training, Orb Energy Manjunath SV, Human Resource, Executive, Orb Energy A Henry Antony, Manager – Training, Orb Energy Geeta, Manager, Orb Energy

For details of all the findings of the desk review and site visit, please refer to the Verification Protocol and Findings in Appendix C.

3.4 Quality of evidence

When verifying the report emission reduction, LRQA ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown in Appendix A.

When assessing the audit trails, LRQA also examined:

1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. the source and nature of the evidence

3. if comparable information was available from sources other than that used in the monitoring report, LRQA cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in Appendix A.

LRQA also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology.

3.5 Resolution of clarification and corrective action requests

LRQA, during this verification, identified issues related to the monitoring, implementation or operation of the proposed CDM project activity that could impair the capacity of the proposed CDM project to achieve emission reductions or influence the reporting of emission reductions. LRQA has identified, discussed and concluded these issues within the Verification Protocol and Findings – Appendix C.

LRQA has raised a Corrective Action Request (CAR) if one of the following occurred:

1. A non-compliance with the monitoring plan or methodology is found in the monitoring and reporting that has not been sufficiently documented by the project participants, or the evidence provided to prove conformity is insufficient
2. Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants
3. Mistakes have been made in applying assumptions, data or calculations in relation to emission reductions that will impact upon the quantity of emission reductions
4. Issues identified in a FAR during validation or previous verification(s) to be verified during verification have not been resolved by the project participants.

LRQA has raised a Clarification Request (CL) if information was insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

All CARs and CLs raised by LRQA during this verification have been resolved. If this was not completed, the ERs cannot be certified and recommended for issuance to the CDM Executive Board.

LRQA has not raised any Forward Action Request (FAR) during this verification.

3.6 Internal quality control

The technical review by a qualified person independent from the verification team, and a review by an authorised decision maker are conducted before the submission of the verification report to the PP and before requesting the issuance of the verified ERs.

4 Verification protocol and conclusions

LRQA has undertaken this verification in accordance with the verification protocol (which is based on the Gold Standard Version 2.2 and Clean Development Mechanism Validation and Verification Standard Version 04.0). Requirements of Gold Standard take precedence where it goes beyond or otherwise states, than the CDM requirements. This section provides an overview of the verification activities and general conclusions. Further details in relation to each element of the protocol and to each finding are shown in Verification Protocol and Findings – Appendix C.

The protocol is structured based on the main verification requirements as follows:

- compliance of the project implementation with the registered project design document

- compliance of the monitoring plan with the monitoring methodology, including applicable tool(s)
- compliance of monitoring activities with the registered monitoring plan
- compliance with the calibration frequency requirements for measuring instruments
- assessment of data and calculation of emission reductions.

4.1 Compliance of the project implementation with the registered project design document

LRQA has determined during the verification process that:

- the implementation and operation of the project activity has been conducted in accordance with the description contained in the registered PDD

LRQA has, by means of a desk review and an on-site visit, assessed that:

- all physical features of the proposed GS project activity proposed in the registered PDD are in place
- the project participants have operated the proposed GS project activity as per the registered PDD.

For details of the implementation status of the project, the actual operation of the proposed GS project activity, any information provided in the monitoring report that is different from that stated in the registered PDD[1], and any approvals of the necessary request of notification or request for approval of changes, please refer to the Verification Protocol in Appendix C.

4.2 Compliance of the monitoring plan with the monitoring methodology, including applicable tool(s)

LRQA has determined that the project implementation is in accordance with the provisions of the registered PDD and GS Passport; and has also verified that the validated monitoring plan is in accordance with the approved methodology applied by the proposed GS project activity.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that the monitoring plan is in accordance with the approved methodology applied by the proposed CDM project activity.

4.3 Compliance of monitoring activities with the registered monitoring plan

LRQA has confirmed that:

1. the monitoring plan and the applied methodology have been properly implemented and followed by the project participants
2. all parameters stated in the monitoring plan, the applied methodology and relevant CDM Executive Board decisions, have been sufficiently monitored and updated as applicable, including:

[1] And has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in future monitoring periods

a. project emission parameters
b. baseline emission parameters
c. leakage parameters
d. management and operational system

3. the accuracy of equipment used for monitoring is in accordance with the relevant guidance provided by the CDM Executive Board and is controlled and calibrated in accordance with the monitoring plan
4. monitoring results are consistently recorded as per approved frequency
5. quality assurance and quality control procedures have been applied in accordance with the monitoring plan.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

The list in the Verification Protocol – Appendix C shows each parameter required by the monitoring plan, and clearly states how LRQA has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters, including the values in the monitoring report.

4.4 Compliance with the calibration frequency requirements for measuring instruments

LRQA has determined that no monitoring equipment has been used by the PP. Therefore, there was no requirement of calibration. This was in accordance with the registered monitoring plan and the applied monitoring methodology.

For details please refer to the Verification Protocol in Appendix C.

4.5 Assessment of data and calculation of emission reductions

LRQA has determined whether:

1. a complete set of data for the specified monitoring period is available
2. information provided in the monitoring report has been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis
3. calculations of baseline emissions, proposed GS project activity emissions and leakage, as appropriate, have been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document
4. any assumptions used in emission calculations have been justified
5. appropriate emission factors, IPCC default values and other reference values have been correctly applied.

For details of whether data was not available because activity levels or non-activity parameters were not monitored in accordance with the registered monitoring plan, a description of LRQA cross-checked reported data, please refer to the Verification Protocol in Appendix C.

LRQA confirms that appropriate methods and formulae for calculating baseline emissions, projects emissions and leakage have been followed.

LRQA is of the opinion that all assumptions, emissions factors and default values that were applied in calculations have been justified.

5 Monitoring of Gold Standard sustainable development indicator

LRQA has confirmed that the PP has monitored the sustainable development indicators in accordance with the sustainability monitoring plan in the registered PDD.

For details relating to verification of sustainable development indicators, please refer to the Verification Protocol in Appendix C.

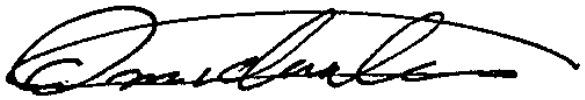
6 Certification report

LRQA has undertaken the first periodic verification of the proposed project activity "Orb Energy Solar Project, India" covering the monitoring period from 12/09/2010 to 31/12/2012 based on the Gold Standard requirements, Version 2.2 in conjunction with the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development.

Through the verification process, the verification team identified 3 CARs, and 3 CLs. The PP has taken actions to address the CARs and CLs and submitted to LRQA the revised monitoring report Version 3.1 dated 01/11/2013 and any other supporting evidence. All CARs and CLs have been appropriately closed before the issuance of the verification report.

The verification team is of the opinion that the proposed project activity has been implemented in accordance with the registered PDD, GS passport the MP with validated revision complies with the approved monitoring methodology, the monitoring complies with the MP and the monitored data and calculation of ERs are assessed and confirmed as correct. Therefore LRQA hereby certifies, and requests the issuance of, the reported ERs of "Orb Energy Solar Project, India" during the monitoring period of 12/09/2010 to 31/12/2012 amounting to 18,573 tCO_2e to the Gold Standard.

Decision Maker



Michiaki Chiba

Climate Change Manager – Asia & Pacific

20/11/2013

7 Appendices

7.1 Appendix A: List of documents reviewed

Category A documents (documents from the PP)

1.	Monitoring report, Version 1 dated: 14/07/2013, Version 3 dated: 23/09/2013, Version 3.1 dated: 01/11/2013
2.	ER spreadsheet, Version 1 dated: 24/07/2013, Version 3 dated: 23/09/2013, Version 3.1 dated: 01/11/2013
3.	Baseline survey used to determine that fossil fuel is used in absence of the Solar PV system
4.	Survey report for monitoring of number of units operating
5.	Technical brochures for Sunstream (flat plate), Sunstream (glass tube), Solite and Solectric.
6.	Sales and installation records of Solar Home System and Solar Photo Voltaic System by Orb Energy for the monitoring period
7.	Orb Energy Database for sales records, installation records, service visit records, branch expansion records
8.	Employment database from Orb Energy
9.	Battery disposal records for the monitoring period
10.	Registration review document
11.	Service visit reports issued by Orb Energy applicable for the monitoring period
12.	Training modules, photograph and attendance records of training
13.	Photographs of units after putting metal plate with embedded identification number.
14.	BITS screenshots
15.	Communication on system serial number dated: 12/09/2013
16.	Human Resource records of Orb Energy including joining report, field recruitment, aptitude test, offer letter and vacancy postings

Category B documents (other documents referenced)

1.	AMS – I.A. Electricity generation by the user, version 14
2.	AMS – I.C. Thermal energy production with or without electricity, version 19
3.	PDD, Version 08.1 dated: 19/02/2013
4.	Gold Standard Passport, Version 03.1 dated: 15/01/2013
5.	Validation report, (Ref: INDIA-GS-val/238.49/2012), dated: 10/03/2013
6.	Gold Standard Local stakeholders consultation report for the project activity
7.	Gold Standard requirements, Version 2.2
8.	Gold Standard Toolkit, Version 2.2
9.	CDM Validation and Verification Standard, Version 04.0
10.	Standard: Sampling and surveys for CDM project activities and programme of activities (Version 4.0)
11.	Guidelines for completing Monitoring report form, Version 04.0 (Annex 7 of CDM-EB75)

7.2 Appendix B: Certificate of Appointment

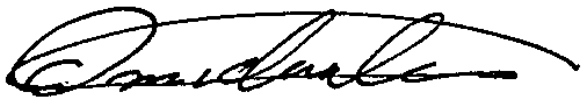
First Periodic Verification of “Orb Energy Solar Project, India”

We hereby certify that the following personnel have engaged in the verification process that has fully satisfied the competence requirements of the verification of the GS project activity.

Name of Person	**Assigned Roles**
Archak Pattanaik	Team Leader, GS Expert
Ankush Jain	Team Member, GS Expert
Arnab Deb	Team Member
Natarajan G	Sector Expert
Ramesh T	Technical Reviewer, GS Expert
Dr. Dhirayuth Chenvidhaya	Sector Expert
Michiaki Chiba	Decision Maker

Signed by

Decision Maker



Michiaki Chiba

Climate Change Manager – Asia & Pacific

20/11/2013

7.3 Appendix C: Verification Protocol and Findings

	Verified situation	Conclusion
SECTION 1. Project implementation in accordance with the registered PDD		
General description of the project		
1.1. Does the MR provide general information of the project and is it as registered by GS?	Yes. The project activity is installation of new Solar energy systems in Karnataka, India. The project activity displaces fossil fuel and/or grid electricity that would have been used in the absence of the project activity. The baseline was determined through the baseline survey conducted at the time of validation. The project broadly involves two types of technologies, Solar Photo Voltaic (SPV) and Solar Home System (SHS)[2]. Brief description is as follows: 1. Solar Water Heating System (SWH): These systems use the thermo-siphoning principle whereby water circulates from the hot water storage tank to the glass tubes by gravity. Since hot water is lighter than cold water, the lighter hot water in the glass tubes rises into the hot water storage tank while the cold water flows in to fill the space left by hot water in the glass tubes. The rate of water movement is determined by how bright and strong the sunshine is. The thermal glass tube or flat plate is placed facing south position for maximum sunlight. Once the	CAR-01 (Closed) CL-01 (Closed) OK

[2] Solar Home Systems (SHS) and Solar Water Heating System (SWH) have been interchangeably used.

system is fully configured, the user can achieve a water temperature of up to 65^{o}C. There are two main categories of the SWH systems i.e. the flat plate and the glass tube systems.

2. Solar Photovoltaic System (SPV): SPV systems include Direct Current (DC) units or Alternating Current (AC) units. For DC units, the solar unit come with the photovoltaic module, battery and charge controller while the AC units, come with a solar photovoltaic module, console battery and inverter. All these units come in different sizes based on user needs. There are two main categories of the SPV systems i.e. solectric (inside lighting) and solite (Street lighting). These are available in various sizes and capacities according to the varying customer needs.

Team confirmed the description based on the review of equipment specifications and site visit.

Team confirmed that the number of units installed in this project activity and its capacity. The summary is as below:

Type	Number of units	Total Installed capacity
Solar Water Heating Systems	19303	12.85 MW
Solar Photovoltaic Systems	13667	0.68 MW
Total Installed capacity		**13.53 MW**

The first unit under the project was installed on 28/11/2007. The units are in operation thereafter.

For the emission reduction calculation purposes, the units which are sold after 28/11/2007 and operated during the monitoring period are

	Verified situation	Conclusion
	considered. Total GHG reduced by the project activity is 18,573tCO_2e during this monitoring period. CAR-01 was raised as technical specification of the equipment was not presented in section A of the MR. In response to the finding the PP has included the technical specification of the equipment. Team confirmed the specification from the review of technical brochures. Therefore, finding was closed. CL-01 was raised as the distribution of various fuel usage types in urban and rural areas is reported in section D.1 of the MR whereas it was not listed in section B.6.2 of the PDD. In response to the finding the PP has removed this parameter from section D.1 and included it in Annex 3. Team checked the correction from the review of revised MR. Therefore, finding was closed.	
1.2. Is the Monitoring report contains both GHG emissions reduction related and sustainable development related parameters?	Yes. Monitoring report contains both GHG emission reduction related and sustainable development related parameters.	OK
1.3. Is there any open issue in the validation / previous verification including FARs? (CDM VVS para. 213)	This is the first periodic verification. There is no FARs issued in the validation report.	OK
Implementation status of the project activity		
1.4. Is the project location indicated as the same as the registered PDD?	The project is located in the Karnataka state of India. Team confirmed the project location from the review of sales records covered in the project activity and the site visit.	OK
1.5. Is the project boundary described in the	Yes, the project boundary is described in the same way as the	OK

<table>
<tr><th></th><th>Verified situation</th><th>Conclusion</th></tr>
<tr><td>same way as the registered PDD? Please confirm each component based on the applied methodology.</td><td>included PDD.
The project boundary includes physical and geographical boundary of the location where SPV or SHS is installed.
As per the applied methodologies, the project boundary is confirmed as:
AMS.I.A, the boundary includes the site of the renewable energy generating unit, i.e. each individual SWH and SPV. This is in accordance with the paragraph 7 of the applied methodology.
AMS.I.C, the project boundary includes:
<table><tr><td>Boundary conditions as per paragraph 15 of the applied methodology</td><td>Justification</td></tr><tr><td>All plants generating power and/or heat located at the project site, whether fired with biomass, fossil fuels or a combination of both</td><td>The project activity utilises only solar power and does not use biomass or fossil fuel. Therefore, this is not relevant for project boundary.</td></tr><tr><td>All power plants connected physically to the electricity system (grid) that the project plant is connected to</td><td>This is included where the baseline energy is sourced from the grid electricity. All grid connected power plants were included. It is included in the project boundary.</td></tr><tr><td>Industrial, commercial or residential facility, or facilities, consuming energy generated by the system and the processes or</td><td>The SPV and SHS are included in the project boundary.</td></tr></table></td><td></td></tr>
</table>

	Verified situation		Conclusion
	equipment affected by the project activity		
	The processing plant of biomass residues, for project activities using solid biomass fuel (e.g. briquette), unless all associated emissions are accounted for as leakage emissions	The project utilises solar energy and does not use or process biomass. Therefore, this is not relevant for project boundary.	
	The transportation itineraries, if the biomass is transported over distances greater than 200 kilometres, unless all associated emissions are accounted for as leakage emissions	The project utilises solar energy and does not transports biomass. Therefore, this is not relevant for project boundary.	
	The site of the anaerobic digester in the case of project activity that recovers and utilizes biogas for power/heat production and applies this methodology on a stand alone basis i.e. without using a Type III component of a SSC methodology	The project utilises solar energy and does not involve anaerobic digester. Therefore, this is not relevant for project boundary.	
	Therefore, the project boundary was in accordance with the applied methodology. During on site assessment the project boundary was confirmed. It is in line with the applied methodologies.		

	Verified situation	Conclusion
1.6. Has on-site fossil fuel consumption, if any, been monitored? Is any emission source missed? Check the site lay-out and confirm through site tour.	No fossil fuel consumption is required to be monitored in this project. It has been confirmed during the site visit while checking the samples that no fossil fuel is being consumed by any of the SPV or SHS.	OK
1.7. Confirm contractors for equipment and installation works	Orb Energy is the manufacturer of the SHS and SPV. Orb Energy was also involved with installation works.	OK
1.8. Confirm conformance with baseline and monitoring methodology - Applicability conditions. Please describe any changes are made in the project design which could impact the applicability conditions of the methodology.	It was confirmed that the project activity is solar home systems and solar PV systems. The units were installed in Karnataka, India. There was no change in the project design which could impact the applicability conditions of the methodology.	OK
1.9. Confirm use or not use of public funding and determine if there is no diversion of ODA to the project activity.	Based on the interview of the PP team confirmed that no ODA has been used in the project activity	OK
1.10. By means of an on-site visit: Is the general information of the project provided in the Monitoring report and is it as registered by GS-Board? List each technical component and equipment and check design parameters and actual status of installation and / or operation. Please check to ensure that all physical features of the proposed GS project activity in the registered PDD are in place and the PP has operated the proposed GS project	Yes, the project activity is installation of new Solar Photo Voltaic and Solar Home Systems at Karnataka, India. Solar Home Systems: 19303 Solar PV Systems: 13667 Capacity of units covered in this project was confirmed during the site visit. The solar water heaters are of flat plate and glass tube types. Capacity of the system is ranging from 100L/day-15000L/day. The solar photo voltaic systems are of DC, AC and lighting systems. The output range of the DC system is from 60Watt hours to 180 Watt hours; AC system is from 225 Watt hours to 14000 Watt hours; lighting system is from 75 Watt hours to 240 Watt hours. No components were added or removed. No site was added or removed.	OK

	Verified situation	Conclusion
activity as per the registered PDD. It may include but not limited to: • the actual capacity and output • capacity of each individual unit and number of units • components are added or extended • plant load factor • type of feedstock • sites are added or removed • operation of other components / units within the project boundary which could affect functioning of the project plant • change in actual operational parameters within the control of PPs, affecting the determination of ERs and investment analysis In cases where there are a large number of components and equipment items and the check of all of them is not an available option, then a random sampling check shall be performed. Justify here the sample chosen and describe the results.[3]	All Physical features of the GS project activity in the registered PDD are in place. The project was operated as per the registered PDD. Out of a population size of 32,970 (19,303 SHS; 13,667 SPV), PP applied random sampling without replacement based on the *"Standard for sampling and surveys for CDM project activities and programme of activities".* The samples size determined separately for both SHS and SPV were 73 and 73 respectively[4] based on a 95% confidence interval and a 5% margin of error requirement for annual survey. Verification team has chosen to check 100 % of the PP's sample data records for both SHS and SPV category. For on site visit, the verification team has performed acceptance sampling method for verifying the PP's samples with an Acceptance Quality Level (AQL) of 1%[5] and Unacceptance Quality Level (UQL) i.e. Lot Tolerance Per-cent Defective (LTPD) 20%[6] and derived a sample size for onsite check. This was in accordance with the paragraph 25 and 26 of "Standard: Sampling and surveys for CDM project activities and programme of activities" (Version 4.0). As per the above standard sample size of 18 with acceptance number as 1 was determined. The team has selected 24 samples each for SHS and SPV from the PP's sample and conducted its onsite	

[3] The sampling shall be in line with the "Standard for sampling and surveys for CDM project activities and programme of activities"
[4] The details of the PP's sampling approach is described in the section 3-6
[5] AQL 0.5%: An AQL level of 1% is commonly used, which gives an acceptance number of 2. However the based on professional judgment verification team has chosen a more stringent acceptance quality level by choosing AQL level as 0.5%, which restricts the acceptance number to 1.
[6] RQL 10%: Commonly used in acceptance sampling.

	Verified situation	Conclusion
	assessment. These samples were more than that required by the sampling standard at defined AQL/UQL limits. All selected SPV and SHS visited were found to be in working condition.	
1.11. Have responsibilities for monitoring been described and specified?	Yes. The responsibility has been defined in the monitoring plan.	OK
1.12. Are the responsibilities and authorities for monitoring and reporting in line with those stated in the registered monitoring plan?	Yes, responsibilities and authorities for monitoring and reporting in the MR have described are in line with the registered PDD.	OK
1.13. Check QA/QC, management systems. Are they consistently applied as described in the MP? a. documented instructions, management manual b. documentation c. data archiving d. monitoring report e. cross-checking f. energy balance analysis (as relevant) g. internal audits / verification and management review	Yes. The Monitoring Plan in the registered PDD describes the data archiving procedures. **GHG emission reduction related:** Sales records and installation records were confirmed from Orb Energy's internal sales/installation system for both thermal and PV units. The sales and installation records were also checked with purchase orders and installation report. Team confirmed that a total of 19030 SWH and 13667 SPV, were sold and installed between 28/11/2007 and 31/12/2012; therefore, considered in this monitoring. The data related to percentage of units operating were estimated based on the survey. The survey was conducted by the PP based on sampling with 95% confidence interval and 5% precision level. Team confirmed the survey based on acceptance sampling approach. Team has visited 18 samples, considering AQL of 1% and UQL of 20%, for SPV and SWH each and confirmed the survey. It was noted that initial survey was conducted considering 18731 SWH and 12940 SPV, therefore, missing 572 SWH and 727 SPV. Team has conducted desk review of these samples and randomly visited 10 samples each of	OK

	Verified situation	Conclusion
	SPV and SWH to confirm that these units are not different than that considered in the survey. Therefore, team confirms that missing these units would not impact survey results. **Sustainable development related:** Team confirmed the employment generation and its quality based on the Human Resource records of Orb Energy. The number of branches of Orb was confirmed from the internal records. The number of batteries scrapped and preventive maintenance records was confirmed from the internal records of battery scrapping and maintenance visit reports and internal records. The preventive maintenance was confirmed from the maintenance visit reports and internal records. The project activity had applied internal reviews at regular intervals.	
1.14. Have the procedures for emergency and abnormal situations been established?	Not applicable	OK
1.15. Has the system for qualification and training been established as relevant for the monitoring and management activities?	Yes. The training of personnel is conducted as per the internal procedures of Orb.	OK
1.16. Check the environmental report, license, permit and compliance to the local environmental legislation (if relevant).	Team confirmed based on its host country expertise that no approval of license is required for the project activity.	OK

	Verified situation	Conclusion
1.17. If from the above assessment the conclusion is that the implementation or operation of the project activity does not conform with the description contained in the registered PDD and/or corrections have been made to project information or parameters fixed at validation, confirm if these changes has been intimated to the Gold Standard:	Not applicable	NA

1.18. If from the above assessment the conclusion is that the implementation or operation of the project activity does not conform with the description contained in the registered PDD and/or corrections have been made to project information, determine if these changes are material. The changes are considered material, if at least one of the following aspects of the project is affected: and/or corrections do not require prior approval by the board:

- Applicability of the applied methodology
- Additionality
- Scale of the project
- Stakeholder consultation
- Sustainable development criteria

A request for approval is required if any of the five issues below is adversely impacted by the identified changes to the project design.

		YES	NO
1.19. The applicability and application of the applied methodology under which the project activity has been registered: Check if the project boundary has changed and if any of the parameters to assess the applicability conditions have changed and impacts its validity/applicability.	Not applicable	NA	NA

	Verified situation	Conclusion	
1.20. The additionality of the project activity: Check if any of the input parameters to the investment analysis have changed. For barrier analysis, check if any information or data used in the barrier analysis has changed.	Not applicable	**YES** NA	**NO** NA
1.21. The scale of the project activity. Check if the project scale is still micro scale, small scale or large scale after the implementation of the changes.	Not applicable	**YES** NA	**NO** NA
1.22. The stakeholder feedback on design change. If it is not required please justify here. If conducted present and justify the appropriateness of the means undertaken for the feedback.	Not applicable	**YES** NA	**NO** NA
1.23. The revision in the sustainable development assessment of the project activity. Validate the Re-evaluation conducted by the PP for each of the 12 sustainable development indicators. Present it in a tabulated form below.	Not applicable	**YES** NA	**NO** NA

	Verified situation	Conclusion	
1.24. Change in sustainable development monitoring plan. Validate and justify that changes in sustainable development assessment requires any changes in sustainable development monitoring plan.	Not applicable		
1.25. New approvals/licenses from environmental/regulatory agencies. Please include details.	Not applicable	NA	NA
If the answer to any of the above items is YES, please conduct an assessment of the potential impacts of these changes following the Annex-AA.			
1.26. If, from the above assessment, the conclusion is that the changes require prior approval by the GS, please check any approvals of the necessary request for approval of changes.	Not applicable	NA	

	Verified Situation	Conclusion
SECTION 2. Compliance of the Monitoring Plan with the Monitoring Methodology including applicable Tool(s)		
2.1. Is the monitoring plan (registered or approved) in accordance with the applied methodology?	Yes. The monitoring plan is in accordance with the applied methodologies AMS.I.A and AMS.I.C	OK
2.2. If the methodology provides different options (for example, use of default values or on-site measurements), has the Monitoring Report specified which option is used?	Yes. The monitoring report specifies that it uses default value of ex-ante emission factors for grid electricity and baseline energy consumption. The emission factor for baseline energy consumption was estimated based on survey.	OK

<table>
<tr><th></th><th>Verified Situation</th><th>Conclusion</th></tr>
<tr><td>2.3. Is all data collected and archived according to the tables in the applied Monitoring Methodology and is this included in the Monitoring Plan?</td><td>Yes.
In accordance with the monitoring plan the parameters relevant to the project activity that need to be monitored are as below.
Carbon related parameters:
<table><tr><th>S. No.</th><th>Parameter</th><th>Source of information</th></tr><tr><td>1.</td><td>Thermal units sales</td><td>Installation records</td></tr><tr><td>2.</td><td>Photo voltaic units sales</td><td>Installation records</td></tr><tr><td>3.</td><td>Number of units not operating</td><td>Field survey</td></tr></table>
Sustainability related parameters:
<table><tr><th>S. No.</th><th>Parameter</th><th>Source of information</th></tr><tr><td>1.</td><td>Quality of employment</td><td>Orb employment database</td></tr><tr><td>2.</td><td>Quantitative employment and income generation</td><td>Orb employment database</td></tr><tr><td>3.</td><td>Access to affordable clean energy services</td><td>Installation records</td></tr><tr><td>4.</td><td>Disposal mechanism of the used batteries</td><td>Orb maintenance records</td></tr><tr><td>5.</td><td>Preventive maintenance service</td><td>Orb maintenance records</td></tr></table>In the above data has been collected and achieved in accordance with the tables in the monitoring plan.</td><td>OK</td></tr>
</table>

	Verified Situation	Conclusion
2.4. Check the calculation of emission reductions following the applied methodology: • baseline emissions • project emissions • leakage • emission reductions of the project.	Yes. Baseline emissions: The baseline emissions are calculated as the fossil fuel or grid electricity consumed in the conventional heating or lighting. It is calculated by multiplying the baseline emission factor for thermal systems with the operational units. Project emissions and leakage emissions are nil as per the methodology and the registered PDD.	OK
2.5. List any monitoring aspect that is not specified in the methodology and check its compliance with the Monitoring Plan, for example: • additional monitoring parameters • monitoring frequency • calibration frequency.	There are no such monitoring aspects.	OK

<table>
<tr><th></th><th>Verified Situation</th><th>Conclusion</th></tr>
<tr><td colspan="3">SECTION 3. Compliance of Monitoring activities with the registered Monitoring Plan</td></tr>
<tr><td>3-1. Is the Monitored Data included in the Monitoring Report as per the Monitoring Plan or any accepted revised MP?
3-2. Has the data been generated at the frequency required by the Monitoring Plan or any accepted revised MP?
3-3. Confirm consistency of the parameters with the data entry sheet provided by the PP.</td><td>Yes.
All monitored data in the MR is as per the registered monitoring plan of the registered PDD & Gold standard passport. The data is generated as per the frequency determined in the monitoring plan as below:
GHG emission reduction related parameters:
The parameters ‘Thermal units sales’, and ‘photo voltaic units sales’ are being continuously monitored.
The parameter ‘number of units not operating’ is being monitored once in two years through survey.

The information on the GHG emission reduction parameters was confirmed against the data entry sheet provided by the PP. This information was also confirmed from the internal database of the PP.</td><td>OK</td></tr>
<tr><td>3-4. Has the monitoring been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised MP?
Confirm that the monitoring and reporting procedures have been implemented as documented and followed by PPs.
Check each parameter with the PDD</td><td>The implementation of monitoring and reporting system is as below:
<table><tr><td>Thermal units sales</td><td>Thermal unit sales are continuously measured from the sales records of orb. The sales of thermal units were recorded through the purchase order in the internal database. Team verified the internal sales database to confirm the total</td></tr></table></td><td>OK</td></tr>
</table>

	Verified Situation		Conclusion
Does the MR contain remarks on the monitoring process used.		number of thermal unit sale.	
	Photo voltaic units sales	Photo voltaic sales are continuously measured from the sales records of orb. The sales of Photo voltaic units were recorded through the purchase order in the internal database. Team verified the internal sales database to confirm the total number of photo voltaic unit sales.	
	Number of units not operating	The PP has conducted a survey to estimate the percentage of operating units for each thermal and photo voltaic units. The sample size of the survey was at 95% confidence interval and 5% margin of error. Actual margin of error or precision achieved was 3.03% for thermal units and 4.33% for SPV units, within the precision level defined at the start of survey. The survey was conducted with in Karnataka region by randomly selecting the samples. The survey was conducted once in two year period for measurement. The registered PDD does not define the monitoring frequency of this parameter. Team confirms that biennial sampling is allowed in Sampling and surveys for CDM project activities and programme of activities (Version 4.0). Therefore, survey frequency of once in two years was accepted. Team has verified the PP's sample used for survey through acceptance sampling technique.	

	Verified Situation	Conclusion
	<table><tr><td></td><td>The sample size for acceptance sampling was determined based on producer and consumer risk of 5% each, AQL of 1% and UQL of 20%; with sample size of 18 and acceptance number of 1.</td></tr></table> All the data used for the GHG emission reduction calculations is monitored for the business operations by the PP. The MR contains the remarks on the monitoring process used.	
3-5. Have types of measurement instrumentation used been described and specified?	Not applicable	NA
3-6. Is the accuracy of equipment used for monitoring sufficient and regularly controlled and calibrated in line with the registered monitoring plan or any accepted revised MP? Check relevance of maintenance and calibration included in the monitoring plan. Check relevance of laboratory analysis if included in the monitoring plan.	Not applicable	NA

	Verified Situation	Conclusion
3-7. Check that responsibilities and authorities for monitoring and reporting are in line with the monitoring plan. Are the monitoring results consistently recorded, reviewed and approved as stated in the PDD or any accepted revised MP?	Yes. The team confirmed the responsibilities and authorities during the site visit. Chief Executive Officer has the overall responsibility of monitoring. Technicians are responsible for completion of installation & service visit records. Records were then transferred to the central database. Customer data is stored in the central database managed by Orb Energy. Technicians Site in-charge is also responsible for calibration of the instruments. Team confirmed from the site visit that during this monitoring period, the monitored data is recorded, reviewed and approved as stated in the monitoring plan of the registered PDD.	OK
3-8. Reporting period: Defined? If a monitoring period of a parameter more / less than a year is applied, check if the monitoring is in a complete and consistent manner?	Yes. The period of monitoring is from 12/09/2010 – 31/12/2012 (first and last days included). The monitoring period is more than a year. The monitoring of the data presented is in a complete and consistent manner.	OK

3.9 Monitoring Parameters and Calibration Checklist:

Complete the following table for each carbon related parameter:

Data / Parameter (as in the MP)		Thermal units Sales	Photo voltaic units sales
Value	Ex ante	-	-
	Ex-post	19303	13667
Measuring frequency		Measured continuously based on installation records	Measured continuously based on installation records
Reporting frequency		Annual	Annual
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes	Yes
Recording (Manually / electronically / …)		Data is recorded electronically in orb's internal database	Data is recorded electronically in orb's internal database
QA/QC How are values verified? (Cross-checked, double-checked,…)		Thermal sales records were checked from actual sales data	PV sales records were checked from actual sales data
Type of Monitoring Equipment and Identification number or Reference in the PDD		NA	NA
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		NA	NA
Period of operating time		NA	NA
Instrument type		NA	NA
Manufacturer, model and serial number		NA	NA
Specific location		NA	NA
Calibration dates		NA	NA
Company performing the calibration		NA	NA
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?		NA	NA
Is calibration valid for the whole reporting period?		NA	NA
Maintenance		NA	NA

Data / Parameter (as in the MP)	Thermal units Sales	Photo voltaic units sales
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes, the data management through the internal database ensures correct transfer of data and reporting emission reductions.	Yes, the data management through the internal database ensures correct transfer of data and reporting emission reductions.
Key reporting risks	Low.	Low.

Data / Parameter (as in the MP)		Number of units not operating
Value	Ex ante	-
	Ex-post	Solar water heater: 0.022% Solar Photo voltaic: 0.045%
Measuring frequency		Biennial based on survey
Reporting frequency		Biennial based on survey
Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?		Yes
Recording (Manually / electronically / …)		Electronically
QA/QC How are values verified? (Cross-checked, double-checked,…)		The margin of error or precision level was estimated to be 5% at the beginning of the survey. Based on the final results of the survey the actual precision level is 3.03% for SHS and 4.33% for SPV. The actual precision level is within the level considered at the start of the survey. The survey results were verified through acceptance sampling with AQL/UQL of 1%/20% of the PP's sample. The sample size at this quality level is 18 with acceptance number as 1. Team selected the samples randomly from the PP's sample and were checked onsite. No non-conformity was identified during the onsite assessment.
Type of Monitoring Equipment and Identification number or Reference in the PDD		NA
Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?		NA
Period of operating time		NA
Instrument type		NA
Manufacturer, model and serial number		NA
Specific location		NA
Calibration dates		NA
Company performing the calibration		NA

Data / Parameter (as in the MP)	Number of units not operating
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	NA
Is calibration valid for the whole reporting period?	NA
Maintenance	NA
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes, the data management through the internal database ensures correct transfer of data and reporting emission reductions.
Key reporting risks	Low

	Verified Situation	Conclusion
SECTION 4. Compliance of Sustainable development Monitoring activities with the registered Monitoring Plan		
4-1. Is the SD Monitored Data included in the Monitoring Report as per the Monitoring Plan and the passport? 4-2. Has the data been generated at the frequency required by the Monitoring Plan or any accepted revised MP? 4-3. Confirm consistency of the Sustainable Development (SD) parameters with the data entry sheet provided by the PP.	Yes. All monitored data in the MR is as per the registered monitoring plan of the registered PDD & Gold standard passport. The data is generated as per the frequency determined in the monitoring plan as below: Sustainable development related parameters: The parameters 'Quality of employment', 'quantitative employment and income generation', 'access to affordable clean energy services', 'disposal mechanism of the used batteries', 'preventive maintenance' are being monitored continuously and recorded once in a year. The information on the SD parameters was confirmed against the data entry sheet provided by the PP. CAR-02 was raised as monitoring of sustainable development indicators were not in line with that in the registered GS passport. In response to the finding the PP has revised the MR. The revised MR now presents the branch expansion records for the parameter 'access to affordable clean energy services'. The number of batteries disposed was corrected. Number and type of employment generated in the each year was clearly described in the revised MR. The correction was in accordance with the registered GS passport. Therefore, finding was closed. CAR-03 was raised as invoice and installation dates were inconsistent with the actual records. The PP has revised the invoice dates and	CAR-02 (Closed) CAR-03 (Closed)

<table>
<tr><td></td><td colspan="2">installation dates in the ER spreadsheet. The information is now consistent with the actual records. Therefore, finding was closed.</td><td></td></tr>
<tr><td>4-4. Has the monitoring been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised MP?
Confirm that the monitoring and reporting procedures have been implemented as documented and followed by PPs.
Check each parameter with the Passport
Does the MR contain remarks on the monitoring process used.</td><td colspan="2">The implementation of monitoring and reporting system is as below:<table>
<tr><td>Quality of employment</td><td>Quality of employment is related to job created by the project activity. Hiring of new employee/commission agent is continuously recorded in the Orb’s internal database. The data is reported on annual frequency as per the MP.
Team checked the database to confirm the job creation by the project activity.</td></tr>
<tr><td>Quantitative employment and income generation</td><td>Quantitative employment and income generation is related to permanent job created by the project. Hiring of new employee is continuously recorded in the Orb’s internal database. The data is reported on annual frequency as per the MP.
Team checked the database to confirm the job creation by the project activity.</td></tr>
<tr><td>Access to affordable clean energy services</td><td>Access to affordable clean energy services is related to number of installations of SWH or SPV. Installation of each system by Orb is continuously recorded in the installation report. This information of report is then transferred to their internal database.
Team checked the database to confirm the number of solar energy installation by the project activity.</td></tr>
<tr><td>Disposal mechanism of</td><td>Disposal mechanism of the used batteries is the number of batteries received by the PP for</td></tr>
</table></td><td>CL-02 (Closed)
CL-03 (Closed)</td></tr>
</table>

the used batteries	disposal. The lead acid batteries used in all SPV systems. All the batteries received from the customer for disposal is recorded in its internal system. PP has outsourced the disposed of batteries to an external agency. Team confirmed the number of batteries sent for disposal from the records of the PP.	
Preventive maintenance service	Preventive maintenance service is the number of service visits made by the PP to the installation. Team confirmed from the interview of the PP that three preventive maintenance services are being offered in the first year of installation. Based on the interview of the Orb's customer and review of service visit reports it was confirmed that maintenance was conducted as planned.	

All the data used for the sustainable development is monitored for the business operations by the PP. The MR contains the remarks on the monitoring process used.

CL-02 was raised as the unit number was missing from the units sampled at site. The PP has taken actions by putting embedded metal plates on those units. Further, an internal memo was issued by the Chief operating officer to all technical staff to check the number during each service visit. Team confirmed the above from the review of photographs of the equipment and review of internal memo. Missing of unit numbers does not impact the ability of emission reduction as the units were uniquely identifiable based on address, and mobile number of customers. Therefore, finding was closed.

	CL-03 was raised as multiple entries of clubbed customer code were found in the database. The PP has corrected the database with only presenting single entry with single customer code. On two occasions in thermal and one in PV clubbed customer code with no multiple entries were found. The number of units was correctly revised based on this. Therefore, finding was closed.	
4-5. Have types of measurement instrumentation used been described and specified?	Not applicable	NA
4-6. Is the accuracy of equipment used for monitoring sufficient and regularly controlled and calibrated in line with the registered monitoring plan or any accepted revised MP? Check relevance of maintenance and calibration included in the monitoring plan. Check relevance of laboratory analysis if included in the monitoring plan.	Not applicable	NA

4-7. Check that responsibilities and authorities for monitoring and reporting are in line with the monitoring plan. Are the monitoring results consistently recorded, reviewed and approved as stated in the PDD or any accepted revised MP?	Yes. The team confirmed the responsibilities and authorities during the site visit. Chief Executive Officer has the overall responsibility of monitoring. Technicians are responsible for completion of installation & service visit records. Records were then transferred to the central database. Customer data is stored in the central database managed by Orb Energy. Technicians Site in-charge is also responsible for calibration of the instruments. Team confirmed from the site visit that during this monitoring period, the monitored data is recorded, reviewed and approved as stated in the monitoring plan of the registered PDD.	OK
4-8. Reporting period: Defined? If a monitoring period of a parameter more / less than a year is applied, check if the monitoring is in a complete and consistent manner?	Yes. The period of monitoring is from 12/09/2010 – 31/12/2012 (first and last days included). The monitoring period is more than a year. The monitoring of the data presented is in a complete and consistent manner.	OK

4.9 SD Monitoring Parameters and Calibration Checklist:

Complete the following table for each sustainable development related parameter:

Indicator (as in the MP)	Quality of employment	Quantitative employment and income generation
Value(s)	Described below	Described below
Description	Type of jobs created (permanent or temporary)	Number of jobs created mainly jobs for local people and income level
Source of data	Orb employment database	Orb employment database

Indicator (as in the MP)	Quality of employment	Quantitative employment and income generation
Monitoring and/or recording frequency	Annually	Annually
Means of Verification	Verification team verified the quality of employment from the review of employment database and interview of the PP and selected employees during onsite assessment. Further, the PP has considered employees which have worked for more than 3 months (90 day) period towards employment generation. Verification team confirms that this approach is appropriate.	Verification team verified the quality of employment from the review of employment database and interview of the PP and selected employees during onsite assessment. Further, the PP has considered employees which have worked for more than 3 months (90 day) period towards employment generation. Verification team confirms that this approach is appropriate.
Key reporting risks	Low The data was checked based on the review of employment records, and HR records. Suitability of the reported data was confirmed from the interview.	Low The data was checked based on the review of employment records, and HR records. Suitability of the reported data was confirmed from the interview.

Indicator (as in the MP)	Access to affordable clean energy services	Disposal mechanism of the used batteries
Value(s)	Described below	Category | Till 2011 | 2012 Batteries scrapped | 26 | 18
Description	Number of units installed by type	Number of old batteries recycled
Source of data	Orb Installation records	Orb Maintenance records
Monitoring and/or recording frequency	Annually	Annually
Means of Verification	It was confirmed from the review of installation records.	Battery disposal system was confirmed from the interview of the PP. Team also con
Key reporting risks	Low Confirmed the units installed based on the review of purchase orders, and installation form. Branch opening records were confirmed from the review of internal records of Orb. This was checked based on the review of Orb internal database. Installation date and branches were visited during the onsite visit.	Low Confirmed the battery disposal from the work order issued to Southern batteries. Battery disposal mechanism was also confirmed based on the interview.

Indicator (as in the MP)	Preventative maintenance service
Value(s)	3 service visits in the first year
Description	No of services being done on each unit
Source of data	Orb Maintenance records
Monitoring and/or recording frequency	Annually

Indicator (as in the MP)	Preventative maintenance service
Means of Verification	Preventive maintenance services were confirmed from their maintenance procedures and actual maintenance records. The maintenance services were confirmed from the interview of selected stakeholders during onsite assessment.
Key reporting risks	Low This was checked based on the review of service visit reports and confirmed during the onsite assessment.

Values:

Quality of employment

Number of jobs created as per type			
year of Joining	year of leaving	Category	Total
2010	2010	Management & Administration	0
		Operations	0
		Sales & Marketing	2
	2011	Management & Administration	2
		Operations	7
		Production	3
		Sales & Marketing	21
		technical2	8
	2012	Operations	5
		Production	2
		Sales & Marketing	10
		technical2	1
	still working	Management & Administration	11
		Operations	5
		Production	3
		Sales & Marketing	21
		technical2	15
2011	2011	Management & Administration	0
		Operations	6

		Production	1
		Sales & Marketing	35
		technical2	4
	2012	Operations	13
		Sales & Marketing	60
		technical2	5
	still working	Management & Administration	15
		Operations	33
		Production	10
		Sales & Marketing	78
		technical2	23
2012	2012	Operations	5
		Production	1
		Sales & Marketing	7
		technical2	3
	still working	Management & Administration	5
		Operations	19
		Production	6
		Sales & Marketing	64
		technical2	31
Grand Total			540

Quantitative employment and income generation

Number of jobs created		
Year of joining	Year of leaving	Total
2010	2010	2
	2011	41
	2012	18
	Still working	55
2011	2011	46
	2012	78
	Still Working	159

2012	2012	16
	Still Working	125
Grand Total		540

Access to affordable clean energy services

Number of PV installed

Year of Installation	Total
2007	64
2008	1125
2009	2306
2010	3950
2011	3871
2012	2351
Grand Total	**13667**

Number of SWH installed

Year of Installation	Total
2007	120
2008	1834
2009	2991
2010	3497
2011	4934
2012	5927
Grand Total	**19303**

Number of branches

Year	New Branches opened	Total number of branches
2007	14	14
2008	26	40
2009	5	45

2010	8	53
2011	16	69
2012	13	82
Grand Total	**82**	**82**

	Verified situation	Conclusion
SECTION 5. Compliance with the calibration frequency requirements for measuring instruments		
The "Monitoring Parameters and Calibration Checklist" in section 3 above shall be checked to determine if the calibration frequency specified in the applied monitoring methodology and/or monitoring plan is followed in the monitoring report and in the monitoring activities. Where a failure to comply with the required frequency is detected, or no frequency is mentioned in the monitoring report, please follow the checklist below:		
5-1. If the calibration has been delayed and the calibration has been implemented after the monitoring period in consideration (that is, the results of delayed calibration are available), confirm that the following conservative approach has been adopted in the calculation of emission reductions: - If the delayed calibration did not show any errors in the measuring equipment or the error was smaller than the maximum permissible error, have the PPs applied the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration? - If the delayed calibration identified an error greater than the maximum permissible error, have the PPs applied the error identified in the delayed calibration test to the measured values taken during the period between the scheduled date of calibration and the	Not applicable.	NA

	Verified situation	Conclusion
actual date of calibration? Confirm that the error has been applied in a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer emission reductions being claimed;		
5-2. If the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification: a. Request the PPs to conduct the required calibration; b. On receipt of the calibration results, determine whether the PPs have calculated the emission reductions conservatively using the approach mentioned in section 4.1 above.	Not applicable.	NA
5-3. If neither the monitoring methodology nor the monitoring plan specify any requirements for calibration frequency for measuring equipment, determine whether the equipment is calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used.	Not applicable.	NA

<table>
<tr><th></th><th>Verified situation</th><th>Conclusion</th></tr>
<tr><td colspan="3">SECTION 6. Assessment of data and calculation of emission reductions</td></tr>
<tr><td>6-1. Have calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, been carried out in line with the formulae and methods described in the monitoring plan and the applied methodology document?
Check consistency in the ERs spreadsheet.</td><td>According to the registered PDD, the project emissions and leakage emissions are nil.
The baseline emissions are calculated as follows:
The baseline emissions for lighting is calculated as:
a) For electricity
$BE_{El,y}$= (Daily bulb usage in hours*Average number of bulbs per household * Average bulb size in W* 365 sunshine days in a year)* $EF_{CM,Grid,y}$
b) For fossil fuel
$BE_{Fossil\ fuel,y}$ = Average mass of fuel (Kg/day)*$NCV_{fossil\ fuel}$(TJ/t)*$EF_{Fossil\ fuel}$ (tCO2/TJ)*365 sunshine days in a year
<table>
<tr><th>Fuel Type</th><th>Fuel mass</th><th>NCV</th><th>EF_{fuel}</th><th>Days</th><th>$BE_{fossil\ fuel}$ (tCO2e/yr)</th></tr>
<tr><td>Kerosene</td><td>0.153</td><td>0.0438</td><td>71.9</td><td>365</td><td>0.142</td></tr>
<tr><td>LPG</td><td>0.20</td><td>0.0473</td><td>63.1</td><td>365</td><td>0.218</td></tr>
<tr><td>Diesel</td><td>0.617</td><td>0.043</td><td>74.1</td><td>365</td><td>0.610</td></tr>
</table>
The baseline emissions for Solar thermal units
a) For electricity
BEy = Average mass of water heated per day (Kg/day)*ΔT(^{o}C)*the specific heat capacity of water (kJ per Kg per ^{o}C)*300 sunshine days in a year)/(kJ to kWh conversion)*$EF_{CM,grid,y}$ in tCO_2/MWh
b) For Kerosene and LPG
$BE_{Fossil\ fuel,y}$ = Average mass of fuel (Kg/day)*$NCV_{fossil\ fuel}$(TJ/t)*$EF_{Fossil\ fuel}$ (tCO2/TJ)*300 sunshine days in a year
<table>
<tr><th>Fuel Type</th><th>Fuel mass</th><th>NCV</th><th>EF_{fuel}</th><th>Days</th><th>$BE_{fossil\ fuel}$ (tCO2e/yr)</th></tr>
<tr><td>Kerosene</td><td>0.124</td><td>0.0438</td><td>71.9</td><td>300</td><td>0.117</td></tr>
</table>
</td><td>OK</td></tr>
</table>

	Verified situation	Conclusion
	<table><tr><td>LPG</td><td>0.28</td><td>0.0473</td><td>63.1</td><td>300</td><td>0.25</td></tr></table> Information provided in the spreadsheet is consistent with the MR.	
6-2. Has the calculation tool been correctly documented? Check its consistency and formulae. • baseline emissions • project emissions • leakage • emission reductions of the project.	Microsoft excel spreadsheet is used as a tool for calculation of baseline emissions, and emission reductions of the project. Formulae & equations used for the calculation in the ER calculation spreadsheet were found to be consistent with the registered PDD and applied methodology.	OK
6-3. Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis? Please describe how LRQA has cross-checked reported data.	During the on-site verification, for the purpose of data cross-checking, the team has reviewed the internal database maintained by Orb, sales records, Installation forms, survey report, maintenance records, employee database etc. Team also visited the selected samples that were used by the PP for survey. Through these approaches, the verification team confirmed that the data for calculation of emission reduction and sustainable development parameters in the MR.	OK
6-4. Have any assumptions used in emission calculations been justified?	Not applicable	NA
6-5. Have appropriate emission factors, IPCC default values, and other reference values been correctly applied?	The emission factor has been determined ex-ante in the registered PDD. It will not change during this crediting period and it is applicable for this verification.	OK

Findings[7]

1. Grade / Ref:	CAR 01	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Section A. of “Guidelines for completing the monitoring report form” EB 75 Annex 7			
5. Nature of the Issue Raised:					
Technical specification and design of the project equipment are not described in the section A of the monitoring report.					
6. Nature of responses provided by the project participants:					
Technical specification and design of the project equipment is now described in section A.					
7. Assessment of such responses:					
Team confirmed from the review of the MR that technical specification has been correctly included. Team confirmed the specification from the review of marketing and technical brochure of the equipment. Therefore, finding was closed.					
8. References to resulting changes in the monitoring report or supporting annexes:					
Section A of the MR					

1. Grade / Ref:	CAR 02	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Section VIII.g.1 of GS requirements V2.2 and Annex I "Guidance on SD indicators"			
5. Nature of the Issue Raised:					

[7] Explanation of the Findings Log structure:
1. Grading and Sequential Number of the finding 2. Date of Original Finding 3. New, Open, Closed 4. Requirement (VVS, PDD-CDM, etc) 5. Reference to Workbook
6. Details of PP's response 7. Evaluation from the Verification team 8. List of changes made as a result of the finding

Back up data for SD parameters such as employment and income generation and battery disposed are not made available to the verification team. Further the employment generated data reported in MR is not appropriate. The data represents the no. of employees at the end of the year, whereas as per the registered monitoring plan no. of net employment generated need to monitored and reported. Battery scrap data for 2012 in MR is not consistent with credit notes issued by the supplier. Why data for branch expansion records will not be presented against the parameter '*Access to affordable clean energy services*'.

6. Nature of responses provided by the project participants:	
ER spreadsheet and the MR have been revised to include the backup data for all the sustainable development indicator parameters. Further, following corrections have been made in the data of sustainable development parameters: For the parameter battery disposal, only records of number of batteries disposed by the PP have been considered and information on number of warranty and non warranty complaints has been removed from MR as this piece of information is not required as per the registered monitoring plan. Battery scrap data for the year 2012 has been corrected in the revised MR to be consistent with the credit notes issued by the battery supplier to whom batteries were sent for disposal. For the parameter quality of employment, it is revised to state the type and number of employees in each year. Further, for calculation of number of employment generated by the project activity only those who have stayed in the organisation for more than three months have been considered. This procedure has been employed as attrition rate is high at Orb. For the parameter access to affordable clean energy services, the records of branch expansion are now included.	

7. Assessment of such responses:	
ER spreadsheet has been revised and it now correctly presents the backup data of the sustainable development parameters. Further, the battery disposal records are presented by correcting the data for the year 2012. The figures were confirmed based on the communication between the PP and the agency appointed by the PP for battery disposal. The data related to quality of employment was revised to present type and number of employment generated. The figures of employment generated are now revised by accounting only the persons who worked for more than three months. This procedure give a conservative estimate of employment generated, therefore, accepted by the team. Further, the branch expansion records were correctly included in the parameter 'Access to affordable clean energy services.' The information related to branch expansion records were confirmed from the review of internal records of the Orb Energy. Therefore, finding was closed.	

8. References to resulting changes in the monitoring report or supporting annexes:	
Section D of MR, ER spreadsheet	

1. Grade / Ref:	CAR 03	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Paragraph 284 (d) (iii) of CDM VVS Version 4.0			
5. Nature of the Issue Raised:					

Following inconsistencies related to installation/invoice dates were detected between ER spread sheet and hard copy of installation forms and invoices;

Thermal

- Invoice dates are not consistent for samples Serial Numbers 95 & 13715
- Installation dates are not consistent for sample Serial Numbers 1501, 1551 & 1744

PV

- Installation dates are not consistent for sample Serial Numbers 4133 & 6809

6. Nature of responses provided by the project participants:	

The ER calculation spreadsheet and the MR have been revised accordingly as follows:

Thermal:

Reference Sl. No. in database	**Error type**	**Incorrect value**	**Revised value**
95	Invoice date	14/12/2007	15/12/2007
13715	Invoice date	31/12/2011	30/12/2011
1501	Installation date	30/09/2008	13/10/2008
1551	Installation date	This does not need a revision, the invoice is dated 15/10/2008 and the installation date is 18/10/2008. The installation form mentions 18/09/2008 owing to an error made by local site staff in mentioning the date. As a control measure, it can be	

		seen that the correct date was mentioned in the installation form at the head office next to the wrong date. Hence no change is required in the ER calculator.	
1744	Installation date	06/11/2008	08/11/2008. This unit was found not working as part of survey.

PV:

Reference Sl. No. in database	Error type	Incorrect value	Revised value
4133	Installation date	19/02/2010	18/02/2010. This unit was found not working as part of survey.
6809	Installation date	22/11/2010	22/10/2010

7. Assessment of such responses:

Team accepted the justification provided by the PP on incorrect installation date for the equipment bearing serial number 1551 based on the review of Orb's internal software, and review of purchase order. Team also noted that using the date mentioned in the internal software results is conservative.

Team confirmed from the review of revised ER spreadsheet and installation forms & purchase orders that dates are correctly revised. This correction in dates does not impact the ER estimate.

8. References to resulting changes in the monitoring report or supporting annexes:

ER spreadsheet

1. Grade / Ref:	CL 01	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Paragraph 226 of CDM VVS Version 4.0			

5. Nature of the Issue Raised:

The parameter "Distribution of various fuel usage types in urban and rural areas" is reported as fixed ex-ante in the MR; however it is

not listed in the section B.6.2 of the registered PDD. Please clarify.

6. Nature of responses provided by the project participants:	

The distribution of various fuel usage types in urban and rural areas has been removed from the section D.1 as it was not included in the section B.6.2. This information is required to calculate emission reductions and presented in the MR in Annex 3

7. Assessment of such responses:	

Team confirmed from the review of the MR that distribution of fuel usage has been removed from section D.1 and presented in Annex 3. This is in accordance with the registered PDD. Therefore, finding was closed.

8. References to resulting changes in the monitoring report or supporting annexes:	

Section D.1 and Annex 3 of the MR

1. Grade / Ref:	CL 02	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Paragraph 226 of CDM VVS Version 4.0			
5. Nature of the Issue Raised:					

During on site assessment system serial numbers which represents serial number, found missing at following checked samples;

User Name	System Serial No. (as per ER spread sheet)
Murugeppa	SLD01203602
Dr Mahantesh G H	SLD0012001074
S B Yadachi	SLD00900632
PRABULINGA. NINGAPPA. SANNAMANI	SLD00902343
Shobha T K	SLD 0090 2626
Manjunath D Patil	SLD00902839

Prakash R	SUC1500066
Hedderi V S	SUGB2000111

Please clarify how the PP has ensured the project boundary is in line with the registered PDD and the double counting is prevented.

6. Nature of responses provided by the project participants:

The project boundary is the geographical boundary of the state of Karnataka. Only the installations that are within the project boundary have been included in the project activity. Please note that all installations bear a logo of Orb Energy. Also, there is no other CDM / gold Standard/ VCS project implemented by Orb Energy covering the same technology. Hence, the possibility of any external unit moving into the project boundary does not exist and double counting on this aspect is not possible.

Although there is a control procedure of marking the system serial number (customer code) on the installed unit, sometimes there are practical constraints in marking the same physically on the installed unit. However, for such cases, the technicians are adequately trained to record in the installation form, other unique identification numbers along with system serial number, at the time of installation to ensure that double counting is avoided and the system can be uniquely identified at the time of subsequent services, monitoring and verification activities. For eg, for each unit installed, detailed end user information is recorded in installation form along with other details like battery serial number, console number, charge controller serial number etc for unique identification in lieu of system serial number (customer code), if that is not available with the installation team at the time of installation.

The same was verified by the DoE team during the site visit through assessment of the installation form which mentioned the following details as well crosschecking the same physically on site.

User Name	**System Serial No. on IF**	**Unit type**	**Other details as mentioned on installation form and checked onsite by the DoE**	**Remark**
Murugeppa	SLD01203602	Solectric 120	Battery Number: IF006V0110; Luminary Serial Numbers: AFC02225, AFC02250, AFC18667, AFC18690	Uniquely identifiable through these numbers on installation form, double counting not possible
Dr Mahantesh G H	SLD0012001074	Solectric 120	Only one unit at site, detailed address available for user	Uniquely identifiable through the end user details on installation form,

			allowing direct access and identification of location	double counting not possible
S B Yadachi	SLD00900632	Solectric 90	Only one unit at site, detailed address available for user allowing direct access and identification of location	Uniquely identifiable through the end user details on installation form, double counting not possible
Prabulinga. Ningappa. Sannamani	SLD00902343	Solectric 90 with 3 L	Battery Number : IG004X1237; Console Number: 120A08110631; Charge Controller Number: 11G14501	Uniquely identifiable through these numbers on installation form, double counting not possible
Shobha T K	SLD 0090 2626	Solectric 90 with 3 L	Battery Number : I J004X0688; Console Number: 120A09110966; Charge Controller Number: 11O7006	Uniquely identifiable through these numbers on installation form, double counting not possible
Manjunath D Patil	SLD00902839	Solite 90	Battery Number : LN049221; Console Number: M17190001587; Charge Controller Number: 11K03067	Uniquely identifiable through these numbers on installation form, double counting not possible
Prakash R	SUC1500066	Sunstream150GP	Only one unit at site, detailed address available for user allowing direct access and identification of location	Uniquely identifiable through the end user details on installation form, double counting not possible
Hedderi V S	SUGB2000111	Sunstream200GV	Only one unit at site, detailed address available for user allowing direct access and identification of location	Uniquely identifiable through the end user details on installation form, double counting not possible

Also, the fact that three preventive maintenance service visits have been carried out on each of these units is also a proof that the

systems are uniquely identifiable and there is no double counting possible.

As a corrective measure, all the identified units have been provided with serial number punch plates. The photographs of the concerned units with the punch plate showing their serial number are being submitted as evidence. Also, the concerned field staff and technicians have been duly instructed to check for the presence of system serial numbers on the installed units during each visit to project households. In case, any such instance is identified where the system serial number is found to be missing, damaged etc, the field staff shall escalate this to the head office for necessary action and tagging the concerned unit with a durable punched plate bearing the unique system serial number.

7. Assessment of such responses:	

Based on the web-search team could not find any other project of Orb Energy under any of the GHG schemes, such as CDM, Gold Standard, Voluntary Carbon Standard. Therefore, nothing has come to the attention of the team that could link these units will be double counted in another GHG programme.

The PP has taken pasted metallic plates with unique number, on each of the above units. Team confirmed it based on the review of pictures submitted by the PP. Further, it was confirmed during the interview of the PP that metallic plate with unique number is being used in all the new units. Team also confirmed from the review of the communication sent by the Chief Operating Officer that unique number will be checked during each service visit.

8. References to resulting changes in the monitoring report or supporting annexes:	

None

1. Grade / Ref:	CL 03	**2. Date:**	02/09/2013	**3. Status:**	Closed
4. Requirement		Paragraph 284 (d) (iii) of CDM VVS Version 4.0			
5. Nature of the Issue Raised:					

PP to clarify why there are multiple entries of clubbed customer code were appropriate for emission reduction calculations:

For example;

Sample Sl. No.	System Sl. No. (Unique ID)	User name
6285	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust
2942	STD01800130,31,32	Superior Karipalaya Health Centre
5507	STD00750300,298	Hemadri KV

PP is requested to clarify

6. Nature of responses provided by the project participants:

It may be noted that in all the referred cases there are as many multiple entries as the clubbed entries. Therefore, these multiple entries do not impact the emission reduction values. Further, these multiple entries were now corrected and single entries were made for better representation. For example, for Sri Nagachala Ayappa Swamy Temple Trust, having 6 Solite installations, 6 entries are there in the ER calculator, one each for the 6 units as mentioned below:

Serial	Customer code	Customer Name	Unit type	Quantity
6284	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6285	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6286	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6287	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6288	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6289	SLD01200272,74,76,75,71,73	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1

The same approach had been used for all cases that were found in the database where there were more than 1 unit with a single customer (SWH as well as PV) and hence this apparent clubbing does not have any impact on VERs.

As a better representation approach, all such cases have now been revised as follows to avoid any confusion:

Serial	Customer code	Customer Name	Unit type	Quantity
6284	SLD01200276	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1

6285	SLD01200275	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6286	SLD01200274	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6287	SLD01200273	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6288	SLD01200272	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1
6289	SLD01200271	Sri Nagachala Ayappa Swamy Temple Trust	Solite120	1

Similarly the thermal sales records have also been updated where it was found.

It was also found that on two occasions for thermal units were actually clubbing was there for which the quantity has been revised from 1 to 2 units and multiple entries were not made. Making multiple entries would have created confusion related to the samples selected using random number generated used for sampling. The summary is as below:

Serial	Customer code	Customer Name	Unit type	Quantity
18	SUC D (F) 0100 0076, 77	Chandra Shetty	Sunstream100C	2
1574	SUG B0150 0166 / 0167	Yogish Kumar MB	Sunstream150GV	2

This has resulted in an increase in the total number of units from 19301 to 19303**.**

Similarly, in case of PV only one occasion clubbing was found and corrected. This is as below:

Serial	Customer code	Customer Name	Unit type	Quantity
6873	SLD00901465,510	Chandrashekar D K & Raghavendra D K	Solectric180	2

This has resulted in an increase in the total number of units from 13666 to 13667**.**

7. Assessment of such responses:

Team has noted that the PP has correctly revised the multiple customer code in the ER spreadsheet where it represents single unit. Further, the serial numbers where one entry was made with two customer codes referring to two units, revision in serial number will create confusion with the survey and other findings. Therefore, it has correctly not been revised. This has resulted in a change of thermal units from 19301 to 19303 and PV units from 13666 to 13667.

Team confirmed the change in number of thermal and PV units from the review of Orb database. Therefore, finding was closed.	
8. References to resulting changes in the monitoring report or supporting annexes:	
Section D.2 of MR, ER spreadsheet	