

# VERIFICATION & CERTIFICATION REPORT

BUREAU OF ENERGY EFFICIENCY

## CFL LIGHTING SCHEME – “BACHAT LAMP YOJANA”

(UNFCCC PoA Ref. No. 3223)

Monitoring Period

(01/01/2013 to 31/10/2013, including both dates)

REPORT No.

CDM.14.VER.004.MP02

(FOR CPA NO. 3223-0001, 3223-0029 TO 3223-0033, 3223-36 TO 3223-50 BATCH 1)

<b>Date of this issue:</b> 11/12/2014	<b>KBS Ref. No.:</b> CDM.14.VER.004.MP02		
<b>PoA Title:</b>	CFL lighting scheme – “Bachat Lamp Yojana”		
<b>Organization:</b>	KBS Certification Services Pvt. Ltd.		
<b>Client:</b>	Bureau of Energy Efficiency		
<b>Monitoring Period:</b>	01/01/2013 to 31/10/2013 (including both dates)		
<b>Summary:</b>			
<p>KBS Certification Services Pvt. Ltd. has performed the second verification of the CDM PoA “CFL lighting scheme – “Bachat Lamp Yojana” and UNFCCC PoA Ref. Number 3223. The request from CME (BEE) for the delinking of Monitoring Report (MR) of CQC (CPA implementer) from EMC, Kerala (CPA implementer) and HPL (CPA implementer) for second verification of BLY-PoA in accordance with the para 239 of CDM project standard, Version 05 and subsequent amendment as proposed in para 50(a) of EB 81 meeting report has been considered for this verification. This verification report covers 21 out of 50 CPAs included under the PoA as on 31/10/2013. The verification includes confirming the implementation of the monitoring plan of the registered PoA DD, CPA DDs and the application of the monitoring methodology as per AMS-II.J, version 03. A site visit was conducted to check the implementation of registered monitoring plan and verify the data submitted in the monitoring report. KBS confirms the following has been reviewed;</p> <ul style="list-style-type: none"> <li>(a) The registered PoA DD, CPA DDs and the monitoring plan, and the corresponding validation opinion;</li> <li>(b) The validation report and first MP verification report;</li> <li>(c) The applied monitoring methodology;</li> <li>(d) The monitoring report to verify that it is as per the standardized format;</li> <li>(e) CER calculations sheets and all supporting documents;</li> <li>(f) Any other information and references relevant to the project activity’s emission reductions;</li> <li>(g) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;</li> </ul> <p>KBS Certification Services Pvt. Ltd. Confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.</p> <p>Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 337,340 tCO<sub>2</sub>e emission reductions during period 01/01/2013 upto 31/10/2013.</p>			
<b>Subject Group:</b> CDM Verification (VVS V5)	<b>Sectoral Scope(s):</b> 3	<b>Methodology:</b> AMS-II.J. (Version 3.0)	
<b>Verification Team:</b>		<b>Monitoring report:</b>	
<b>Team Leader</b>	Kaushik Pal	First version	30/06/2014
<b>Verifier</b>	Akhilesh Joshi Sayali Kumar	Final version	10/12/2014
<b>Local Expert</b>	Akhilesh Joshi		
<b>Technical Expert (03.1)</b>	Kaushik Pal Akhilesh Joshi		
<b>Independent Technical Reviewer Team:</b>		<b>Verification status:</b>	
<b>Date</b>	12/12/2014	<input type="checkbox"/> Findings not closed.	
<b>Technical Reviewer</b>	Sanjay Kandari	<input type="checkbox"/> Draft verification opinion	
<b>Technical Expert (03.1)</b>	Gagandeep Kakkar	<input checked="" type="checkbox"/> Final verification opinion	
<b>Manager T&amp;C</b>	Gagandeep Kakkar		
<b>Date</b>	12/12/2014		
<b>Authorized Signatory:</b>		<b>Indexing Terms</b>	
<b>Date</b>	12/12/2014	<input checked="" type="checkbox"/> No distribution without permission from client	
<b>Managing Director</b>	Kaushal Goyal		
<b>Revision history:</b>		<input type="checkbox"/> Limited distribution	
<b>Date</b>	<b>Rev. No.</b>	<input type="checkbox"/> Unrestricted distribution	

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## Abbreviations

AMS	Approved Methodology Small Scale
APCPDCL	Andhra Pradesh Central Power Distribution Company Limited
BEE	Bureau of Energy Efficiency
BIS	Bureau of Indian Standard
BLY	Bachat Lamp Yojana
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CERs	Certified Emission Reductions
CFL	Compact Fluorescent Lamp
CL	Clarification Request
CME	Coordinating/Managing Entity
CO <sub>2</sub> e	Carbon dioxide equivalent
COP	Conference of Parties
CPA	Component Project Activity
CQC	C-Quest Capital Malaysia Ltd.
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
GEMS	Global E-waste Management Service
GHGs	Greenhouse Gas(es)
H,M,L	High, Medium, Low
ICL	Incandescent Lamp
IS	Indian Standard
ISP	Independent Service Provider
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KBS	KBS Certification Services Pvt. Ltd.
KP	Kyoto Protocol
kWh	Kilo Watt Hour
LFR	Lamp Failure Rate
MR	Monitoring Report
MP	Monitoring Plan
MWh	Mega Watt Hour
NDPL	North Delhi Power Limited
NGV	Nirmala Green Ventures
PoA-DD	Programme of Activities- Design Document
PF	Power Factor
PoA	Programme of Activities
PS	CDM Project Standard
PCP	CDM Project Cycle Procedure
PSPCL	Punjab State Power Corporation Limited
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM Validation & Verification Standard
WHEP	WHEP Foundation

## Conversion Factors and Definitions

1 MWh = 1,000 kWh

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## 1. INTRODUCTION

### 1.1 Objective

KBS has been commissioned by Bureau of Energy Efficiency to perform an independent verification of its registered CDM PoA "CFL lighting scheme – "Bachat Lamp Yojana", and CPAs UNFCCC ref. no. 3223-0001, 3223-0029 to 3223-0033, 3223-36 to 3223-50, for the reported GHG emission reductions for the given monitoring period 01/01/2013 upto 31/10/2013 (both dates included). Based on the request from CME (BEE) for the delinking of Monitoring Report (MR) of CQC (CPA implementer) and HPL (CPA implementer) from EMC, Kerala (CPA implementer) for second verification of BLY-PoA, the delinked monitoring report had been webhosted as per the para 239 of CDM project standard, Version 05<sup>B06b/</sup>, consisting of 30 CPAs of two implementers – 21 CPAs by CQC and 9 CPAs by HPL. During the course of verification, based on the request from CME (BEE) for the delinking of Monitoring Report (MR), the monitoring report has been further delinked to include only the 21 CPAs of CQC (CPA implementer) in the final MR for second verification of BLY-PoA in line with the amendment as proposed in para 50(a) of EB 81 meeting report for this verification. The CDM PoA & CPA must undergo independent third party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the registered PoA DD, CPA DD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report and other supporting documents are complete;
- The actual monitoring systems & procedures and monitoring report conforms with the requirements of the approved monitoring plan and the approved monitoring methodology;
- The data is recorded and stored as per the monitoring methodology and approved monitoring plan.

### 1.2 Scope

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

- (a) The registered PoA DD, CPA DD, including the monitoring plan and the corresponding validation opinion(s);
- (b) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- (c) The applied monitoring methodology;
- (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- (e) All information and references relevant to the project activity's resulting in emission reductions

The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

KBS has, based on the recommendations in the latest version of CDM Validation and Verification Standard, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

### 1.3 Description of the Programme of Activity

<i>Project Parties:</i>	<i>India (Host)</i>
	<i>Netherlands</i>
<i>Title of project activity:</i>	<i>CFL lighting scheme – "Bachat Lamp Yojana"</i>

UNFCCC Registration No:	UNFCCC registration No. 3223
PoA Registration date:	29/04/2010
Applied methodology:	AMS-II.J, version 03
CPA-wise start date of crediting period:	Refer Table 1 below
Project Participants:	Bureau of Energy Efficiency, C- Quest Capital Malaysia Limited
Location of the project activity:	The project activity CPAs covered under this monitoring report spreads across 3 States in India (Host Country). The States that fall within this project boundary include Delhi, Punjab and Andhra Pradesh.

**Table 1: Start Date of Crediting Period of Individual CPAs**

CPA UNFCCC Ref. No.	Crediting period Start date (in DD/MM/YYYY)
3223-0001	29/05/2011
3223-0029	10/04/2012
3223-0030	*
3223-0031	07/07/2012
3223-0032	06/01/2012
3223-0033	*
3223-0036	03/03/2012
3223-0037	04/05/2012
3223-0038	27/10/2012
3223-0039	22/11/2012
3223-0040	*
3223-0041	14/08/2012
3223-0042	*
3223-0043	25/07/2012
3223-0044	20/04/2012
3223-0045	09/10/2012
3223-0046	29/03/2012
3223-0047	29/03/2012
3223-0048	23/12/2012
3223-0049	29/03/2012
3223-0050	08/08/2012

\* The cells are left blank as the respective CPAs are not implemented during this monitoring period and therefore did not account for the ER calculations in the current verification. The status of these four (4) unimplemented CPAs (3223-0030, 3223-0033, 3223-0040 and 3223-0042) is reported in Table-5 of this verification report.

This PoA and CPAs involve the replacement of existing less efficient incandescent lamps (ICLs) with higher efficient compact fluorescent lamps (CFLs), which results in energy savings. The project involves the distribution of 5,232,240 CFLs<sup>/P04/</sup> in the 17 implemented CPAs out of 21 CPAs covered under this monitoring report<sup>/P02/</sup>. The remaining 4 CPAs 3223-0030, 3223-0033, 3223-0040 and 3223-0042 of CQC, are not implemented during this monitoring period, due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CPA Implementer to go ahead with the implementation of the pending four CPAs<sup>/P26/</sup>. Detailed implementation status of these 4 CPAs has been discussed in section 3.2 of this report and PP has also reported the same in monitoring report, thus complying with para 194b of PS, V5 and para 226b of VVS, V5. All the active CPAs are located in the fourteen (14) districts across 3 states of India (host country), namely Delhi, Punjab and Andhra Pradesh.

The latitude and longitude information on the major cities and towns within the project boundary, where CFLs were distributed (i.e. 17 implemented CPAs) is mentioned in the Table 2 below:

**Table 2: Geographic Location of Implemented CPAs**

UNFCCC Ref. No.	State	District /Town/ City	Latitude	Longitude
			Decimal Degree +	Decimal Degree +
3223-0001	Andhra Pradesh	Ranga Reddy	21.125498	81.914063
3223-0029	Delhi	Shalimar Bagh, Model Town	28.7127	77.1623
3223-0031	Delhi	Pitampura, Rohini	28.6896	77.1312
3223-0032	Delhi	Mangol Puri, Moti Nagar	28.6602	77.1384
3223-0036	Punjab	Amritsar	31.634	74.8723
3223-0037	Punjab	Kapurthala, Jalandhar	31.3071	75.5782
3223-0038	Punjab	Tarn Taran , Amritsar	31.45	74.9253
3223-0039	Punjab	Tarn Taran, Kapurthala	31.2817	74.8574
3223-0041	Punjab	Mohali, Ropar	30.7488	76.6413
3223-0043	Andhra Pradesh	Ranga Reddy	17.4359	78.3417
3223-0044	Andhra Pradesh	Ranga Reddy	17.4833	78.4166
3223-0045	Andhra Pradesh	Ranga Reddy	17.6283	78.5746
3223-0046	Andhra Pradesh	Hyderabad	17.3614	78.4744
3223-0047	Andhra Pradesh	Hyderabad	17.4342	78.4546
3223-0048	Andhra Pradesh	Hyderabad	17.4654	78.478
3223-0049	Andhra Pradesh	Ranga Reddy	17.3447	78.5183
3223-0050	Andhra Pradesh	Ranga Reddy	17.3325	77.9047

The location details of the major cities and towns as provided in the monitoring report were cross verified and confirmed by the verification team from itouchmap website<sup>/B09b/</sup> and the location details of the visited towns were also confirmed at the time of site visit.

The purpose of the PoA is to decrease the energy consumption of Households over Delhi, Punjab, Andhra Pradesh states of India by replacing incandescent lamps (ICLs) with compact fluorescent lamps (CFLs).

In CFLs, the electrical current from the ballast flows through the gas, causing it to emit ultraviolet radiations. The phosphor coating converts the ultraviolet radiation emitted to visible light spectrum. The four wattage type CFLs (11W,14W, 18W and 20W) distributed under the project activity would deliver at least the replaced ICL equivalent lumens as derived from the Indian standard IS 418:2004<sup>/B12/</sup> for ICLs. The 11W (620 lumen output) and 14W CFLs (760 lumen output) is replacing 60W ICLs having 620 lumen output, 18 W and 20W CFLs is replacing 100W ICLs having the same lumen output of 1,240. Thus, almost for the same lumen output, the CFLs consume less power (wattage) than the ICLs. Moreover the rated lifetime of the CFLs is 10,000 hours which is much greater than the replaced ICLs, having a rated life of 1,000 hours. The project lamps were manufactured and supplied by Philips Electronics India Limited, HPL, Halonix, Energetic and Glomore as per the purchase agreement<sup>/P06/</sup>.



Thus, reduction in the power demand has been achieved by using energy efficient CFLs, resulting a reduction of Green house gas (GHG) emissions.

Each household has received a maximum number of 4 CFLs which is as per the registered PoA DD<sup>B04/</sup>. This is also confirmed during on site visit that none of the visited household has received more than 4 CFLs in exchange of equal number of working ICLs. The project CFLs is in compliance with Indian Standard IS 15111:2002<sup>B12/</sup>, which is the national standard for self-ballasted compact CFLs in India. The CFLs have unique identified logo<sup>P18/</sup>. The information of the exchange of lamps at the households was recorded in the electronic database<sup>P13/</sup>. The electronic database have all the unique details including the Consumer No, RR Number (Address), Name, Electricity Board subdivision name, Name of Electricity Circle, Number and type of CFLs given (14 W and 20 W), Number and type of working ICLs collected (60 W and 100 W), Date of installation.

## 2. METHODOLOGY

KBS follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available at UNFCCC website as per CDM procedures.

A desk review of the project documentation is undertaken, which is followed by an onsite visit by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and version 5.0 of CDM VVS, to capture the assessment of applicable CDM requirements viz., version 5.0 of CDM Project Standard, registered PoA DD, CPA DD, applied methodology and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team members and the nonconformities, if any. The verification protocol is an internal document, and is available on request. Following are the major milestones for the verification under consideration.

### ***Duration of verification***

<i>Verification Contract</i>	18/06/2014
<i>Publication of MR</i>	09/07/2014
<i>On site verification</i>	24/7/2014-26/07/2014, 28/07/2014-01/08/2014, 04/08/2014- 08/08/2014
<i>Draft Verification Report</i>	8/12/2014
<i>Final Verification Report</i>	11/12/2014

### 2.1 Review of Documentation

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section 'References'

### 2.2 Site Visits

A site visit is undertaken by members of verification team, involving but not limited to,

- An assessment of the implementation and operation of the proposed CDM PoA as per the registered PoA DD, CPA DD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved monitoring plan;
- A cross-check between information provided in the monitoring report and data from other sources such as plant log books, inventories, purchase records or similar data sources;
- A check of the monitoring equipment, including calibration performance and observations of monitoring practices against the requirements of each CPA-DDs and the selected methodology;
- A review of calculations and assumptions made in determining the GHG data and emission reductions;

- An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The site visit for this verification assessment was undertaken by {Kaushik Pal (Team Leader, Technical Expert), Akhilesh Joshi (Technical Expert, Local Expert), Sayali Kumar (Verifier)} and details are mentioned below;

<b>Location</b>	States: Punjab, Delhi, Andhra Pradesh; Country: India	
<b>Dates</b>	24/7/2014-26/07/2014, 28/07/2014-01/08/2014, 04/08/2014-08/08/2014	
<b>Key points discussed</b>	<b>Name of person interviewed</b>	<b>Designation, Organization</b>
Implementation and Operation of the CDM project activity based on Registered Monitoring Plan and physical features of the project activity as per PoA-DD and CPA-DDs	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Information flows for generating, aggregating and reporting the monitoring parameters	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Competency of the operating personnel and monitoring personnel	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Ex Post Sampling Survey and data collection procedures	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Quality Control and Quality Assurance procedures against the registered monitoring plan	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Calculation and assumptions made in determining the GHG data and emission reductions	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Compliance with CDM criterion and relevant guidance with respect to registered monitoring plan	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Level of accuracy of the monitoring activity	Tridip Kumar Goswami Vineet Kumar Garg	Head of Compliance, CQC Compliance Specialist, CQC
Installation and operation of the distributed CFLs (through random sampling approach)	306 households in Andhra Pradesh, 78 households in Delhi, 185 households in Punjab.	

## 2.3 Reporting of Findings

During the course of verification the findings may be raised as under;

CAR is raised if one of the following occurs:

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

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

FAR is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

The verification report contains (section 7) all CARs, CLs and FARs raised during this verification in transparent manner and provides clear information of the issues raised, response received and its resolutions, including the changes in the documents. Additionally, major changes between the webhosted MR and final MR are presented under Section 6 (below the Reference) for easy reference.

## 2.4 Verification Assessment

Based on the desk review and site visit the team leader fills in the verification protocol to identify and record the findings in the context of the project activity. The findings are communicated to the client in the findings document (section 7 of report). The project documentation, including responses to the findings is reviewed by the team leader in consultation with team members, wherever appropriate. The team leader prepares the draft verification report subject to closure or non-closure of the findings.

## 2.5 Internal Quality Control

The draft verification report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by KBS are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Manager Technical and Certification. The technical reviewer and Manager T&C can be same person.

The final decision is authorized by Managing Director, KBS once the report is approved by the Manager T&C.

### 3. VERIFICATION FINDINGS

#### 3.1 Remaining Issues (FARs from Previous Validation or Verification)

The current verification is for the second monitoring period of the PoA. All raised CARs and CLs were successfully closed during the validation of the CDM PoA and Validation of the included CPAs and the first verification. Assessment team has confirmed from the project web page<sup>/B08/</sup> that there is no issue pending from validation and first verification pertaining to CPAs included in this batch.

#### 3.2 Compliance of project implementation with registered PoA-DD and CPA-DD

##### Discussion:

The project was implemented and equipment installed as described in the registered PoA-DD and CPA-DDs<sup>/B04/</sup>.

The report applies to the second verification of the following CPAs:

**Table 3: Title and UNFCCC Reference Number of Individual CPAs**

CME -Unique Identification No.	UNFCCC Ref. No.	SSC CPA Title
001-CQC-AP	3223-0001	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy North Circle, Habsiguda Division, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
029-CQC-DL	3223-0029	CFL lighting scheme – “Bachat Lamp Yojana” in Shalimar Bagh District of North West Circle and Model Town District of North Circle, North Delhi Power Limited, Delhi, India
030-CQC-DL	3223-0030	CFL lighting scheme – “Bachat Lamp Yojana” in Keshav Puram, Civil Lines and Shakti Nagar Districts of North Circle, North Delhi Power Limited, Delhi, India
041-CQC-DL	3223-0031	CFL lighting scheme – “Bachat Lamp Yojana” in Pitampura District of North Circle, Rohini District of Northwest Circle, North Delhi Power Limited, Delhi, India
042-CQC-DL	3223-0032	Bachat Lamp Yojana” in Moti Nagar District of North Circle, Mangol Puri District of Northwest Circle, North Delhi Power Limited, Delhi, India
043-CQC-DL	3223-0033	CFL lighting scheme – “Bachat Lamp Yojana” in Bawana District, Badli District and Narela District of North West Circle, North Delhi Power Limited, Delhi, India
036-CQC-PB	3223-0036	CFL lighting scheme – “Bachat Lamp Yojana” in Industrial, City Center, Hakima Gate and Civil Line Divisions of Amritsar City Circle and East and West Divisions of Amritsar Sub Urban Circle, Punjab State Power Corporation Limited, Punjab, India
037-CQC-PB	3223-0037	CFL lighting scheme – “Bachat Lamp Yojana” in Kartarpur Division of Kapurthala Circle and Model Town, East and West Divisions of Jalandhar Circle, Punjab State Power Corporation Limited, Punjab, India

038-CQC-PB	3223-0038	CFL lighting scheme – “Bachat Lamp Yojana” in Rayya and City Tarn Taran Divisions of Tarn Taran Circle and Sub Urban, Jindal guru and Ajnala Divisions of Amritsar Sub Urban Circle, Punjab State Power Corporation Limited, Punjab, India
039-CQC-PB	3223-0039	CFL lighting scheme – “Bachat Lamp Yojana” in Sub Tarn Taran, Patti and Bhikiwind Divisions of Tarn Taran Circle and City Kapurthala and Sub Urban Kapurthala Divisions of Kapurthala Circle, Punjab State Power Corporation Limited, Punjab, India
040-CQC_PB	3223-0040	CFL lighting scheme – “Bachat Lamp Yojana” in City Nakodar and Sub Urban Nakodar Divisions of Kapurthala Circle and Phagwara and Cantt. Divisions of Jalandhar Circle, Punjab State Power Corporation Limited, Punjab, India
044-CQC-PB	3223-0041	CFL lighting scheme – “Bachat Lamp Yojana” in Mohali, Zirakpur and Lalru Divisions of Mohali Circle and Kharar Division of Ropar Circle, Punjab State Power Corporation Limited, Punjab, India
045-CQC-PB	3223-0042	CFL lighting scheme – “Bachat Lamp Yojana” in City Ferozpur, Sub-urban Ferozpur, Jalalabaad and Zira Divisions of Ferozpur Circle and Fazilka Division of Muktsar Circle, Punjab State Power Corporation Limited, Punjab, India
031-CQC-AP	3223-0043	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy North Circle, Gachibowli Division, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
032-CQC-AP	3223-0044	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy North Circle, Kukatpally Division, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
033-CQC-AP	3223-0045	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy North Circle, Medchal Division, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
049-CQC-AP	3223-0046	CFL lighting scheme – “Bachat Lamp Yojana” in Hyderabad District, Hyderabad South Circle, Asmangadh and Charminar Divisions, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
050-CQC-AP	3223-0047	CFL lighting scheme – “Bachat Lamp Yojana” in Hyderabad District, Hyderabad Central Circle and Hyderabad North Circle with underlying Azamabad and Green Lands Divisions respectively , Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
051-CQC-AP	3223-0048	CFL lighting scheme – “Bachat Lamp Yojana” in Hyderabad District, Hyderabad North Circle, Bowenpally and Paradise Divisions, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
052-CQC-AP	3223-0049	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy South Circle and Ranga Reddy East Circle with underlying Champapet and Saroornagar Divisions respectively, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India
053-CQC-AP	3223-0050	CFL lighting scheme – “Bachat Lamp Yojana” in Ranga Reddy District, Ranga Reddy South Circle, Vikarabad and Rajendra Nagar Divisions, Central Power Distribution Company of Andhra Pradesh Limited, Andhra Pradesh, India

The PoA involves the distribution of CFL in exchange of ICL bulbs and INR: 15.00 for household use. The total number of CFL distributed under the above mentioned CPAs (17 implemented CPAs) are 5,232,240<sup>/P04/</sup>. The details of implementation of the 17 implemented CPAs are provided below –

**Table 4: Implementation Status of Individual CPAs (17 implemented CPAs)**

UNFCCC Reference No.	Start date of CFL distribution/ installation	End date of CFL distribution/ installation	Date of completion of destruction of ICLs	Start Date of 1 <sup>st</sup> ex post Monitoring survey	End Date of 1 <sup>st</sup> ex post Monitoring Survey
3223-0001	11/05/2011	09/10/2011	21/10/2011	23/12/2011	06/01/2012
3223-0029	16/01/2012	10/04/2012	03/06/2012	07/11/2012	05/12/2012
3223-0031	21/05/2012	03/07/2012	13/07/2012	20/11/2012	25/11/2012
3223-0032	19/10/2011	06/01/2012	25/01/2012	26/11/2012	30/11/2012
3223-0036	05/12/2011	03/03/2012	19/03/2012	12/10/2012	16/10/2012
3223-0037	20/02/2012	04/05/2012	23/05/2012	18/10/2012	22/10/2012
3223-0038	25/08/2012	27/10/2012	27/11/2012	14/02/2013	23/02/2013
3223-0039	08/09/2012	22/11/2012	27/11/2012	25/02/2013	06/03/2013
3223-0041	25/06/2012	14/08/2012	22/10/2012	26/10/2012	30/10/2012
3223-0043	26/05/2012	25/07/2012	31/07/2012	08/12/2012	13/12/2012
3223-0044	26/02/2012	20/04/2012	25/04/2012	21/09/2012	26/09/2012
3223-0045	11/08/2012	09/10/2012	17/10/2012	24/12/2012	29/12/2012
3223-0046	17/02/2013	17/05/2013	21/05/2013	21/10/2013	26/10/2013
3223-0047	21/01/2013	09/03/2013	12/03/2013	29/10/2013	04/11/2013
3223-0048	09/11/2012	23/12/2012	27/12/2012	13/06/2013	19/06/2013
3223-0049	17/02/2013	18/05/2013	21/05/2013	28/10/2013	02/11/2013
3223-0050	04/06/2012	07/08/2012	24/08/2012	16/12/2012	22/12/2012

This schedule of distribution was found in line with registered PoA DD and CPA DDs. This was verified with the electronic database <sup>/P13/</sup> and the letter from the CPA implementers (CQC) to CME (BEE) <sup>/P20/</sup>. This distribution schedule and corresponding dates were also verified during site visit interview with the respective households. KBS has conducted an on- site visit and confirmed that the programme has been implemented and operated as described in the registered PoA DD <sup>/B04/</sup>.

The total number of CFLs proposed for installation by the PP in the registered CPA-DDs of 17 implemented CPAs is 8,081,148 <sup>/B04/</sup>. Verification team checked the technical specification of the project lamps from the master purchase agreement <sup>/P06/</sup> as provided by the CFL manufacturer (i.e. Philips, Halonix, Energetic and Glomax ) and found that same is in line with the PoA DD <sup>/B04/</sup> as well as MR <sup>/P02/</sup>. However, based on the participation of the consumers, PP had distributed a total number of 5,232,240 CFLs <sup>/P04/</sup>. The distribution of the CFLs is recorded in accordance with the monitoring information provided in the registered PoA DD <sup>/B04/</sup>. During on site visit the verification team has not identified any changes or deviation from the monitoring information proposed by the PP in the registered PoA DD.

The distribution team of the PP distributed and installed the high power factor (>0.85) compact fluorescent lamps (CFLs) in exchange of existing less efficient working incandescent lamps (ICLs) for the households located in the Delhi, Punjab and Andhra Pradesh states of India. The start date as well as completion date of installation of each CPA location is incorporated in the section B.1 of the MR <sup>/P02/</sup>. The dates are in line with the electronic database <sup>/P13/</sup> as well as the confirmation letter issued by the CME (BEE) <sup>/P20/</sup>. The single date for the start date of the CFL installation (earliest date across all locations of a particular CPA) and single date for completion date (latest date across all locations of a particular CPA) of the CFL installation has been considered for the each implemented CPA (refer Section A.1 of MR). Verification team has checked the confirmation letter issued by CPA implementers <sup>/P20/</sup> and ER spreadsheet <sup>/P04/</sup> to assess total number of 5,232,240 CFLs <sup>/P04/</sup> and concludes that 5,232,240 CFLs have been distributed and installed in the households.

Present status of the inactive (unimplemented) CPAs during the 2nd Monitoring period (01/01/2013 - 31/10/2013) is mentioned below -



**Table 5: Implementation Status of Individual CPAs (4 unimplemented CPAs)**

<b>CME -Unique Identification No.</b>	<b>UNFCCC Ref. No.</b>	<b>Status of Implementation</b>
030-CQC-DL	3223-0030	The CPA was not implemented during the 2nd Monitoring period (01/01/2013 to 31/10/2013). The reason sighted by CPA implementor (CQC) is due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CQC to take up further pending four CPAs. Verification team confirms the same through interview with CME (BEE) and CPA implementor (CQC).
043-CQC-DL	3223-0033	The CPA was not implemented during the 2nd Monitoring period (01/01/2013 to 31/10/2013). The reason sighted by CPA implementor (CQC) is due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CQC to take up further pending four CPAs. Verification team confirms the same through interview with CME (BEE) and CPA implementor (CQC).
040-CQC-PB	3223-0040	The CPA was not implemented during the 2nd Monitoring period (01/01/2013 to 31/10/2013). The reason sighted by CPA implementor (CQC) is due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CQC to take up further pending four CPAs. Verification team confirms the same through interview with CME (BEE) and CPA implementor (CQC).
045-CQC-PB	3223-0042	The CPA was not implemented during the 2nd Monitoring period (01/01/2013 to 31/10/2013). The reason sighted by CPA implementor (CQC) is due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CQC to take up further pending four CPAs. Verification team confirms the same through interview with CME (BEE) and CPA implementor (CQC).

#### **CFL Distribution and Installation:**

In exchange of the less efficient working ICLs and INR 15, CPA implementer has distributed and installed the high power factor CFLs in the individual households located in the Delhi, Punjab and Andhra Pradesh states of India. The distribution and installation of the CFLs were carried out by the CPA implementer as described in the registered PoA DD<sup>/B04/</sup>. Each and every replacement of the ICL with CFL has been recorded in the electronic database<sup>/P13/</sup> with a unique identification number (i.e. consumer no/ RR no provided by the state electricity boards).

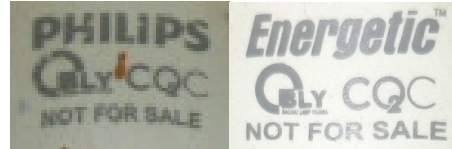
As per the Project Implementation Manual developed by CPA Implementer<sup>/P24/</sup> and as mentioned in the section A.4.2 of registered PoA-DD<sup>/B04/</sup> and section A.2 of the respective CPA-DDs, the CFLs were distributed on 1) door to door distribution mode or 2) through dedicated distribution points. However, during verification, DOE has observed during on site visit that all the CPAs have considered option 2) i.e distribution through dedicated points. The same was verified by the verifying DOE by -

- Interviewing benefited households under the CPA
- By verifying the advertisement which was published in the local media
- By verifying leaflet or any other advertisement material used by the investor to inform local households prior and during the CFL distribution period
- By verifying agencies/individuals involved in the CFL distribution process

Each CFL was distributed against INR 15, which was also demonstrated via on-site interviews conducted by the verification team. By checking the sample consent deeds<sup>/P25/</sup> during on site visit and on-site observation, verification team has found that not more than four (4) CFLs were installed for



each household and CFLs are located in family rooms, bedrooms and kitchens. The verification team further also confirmed during site visit that the CFLs distributed in the visited households are having three (3) unique identification logos of “CPA Implementers name”, “BLY” and “not for sale”<sup>P18/</sup> as mentioned in the Registered PoA DD<sup>B04/</sup> to confirm the installed CFLs in the visited households are the project CFL. The following logo was found on project lamps during the on-site visit:



Verification team checked the BLY PoA project details in UNFCCC website (UN reference number: PoA 3223)<sup>B08/</sup>, whereby this is confirmed that no railway project is included in the BLY program and the boundary of this projects is not falling within one kilometer (1 km) of the project boundary of the included CPAs under BLY PoA project.

The verification team has cross checked the distribution and installation of the CFLs by applying random sampling approach.

#### Verification of sampling approach applied by PP:

In accordance with §22(a) of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0) /B13/ and §17 of methodology AMS-II.J. (Version 03)<sup>B01/</sup>, the verification team confirms the 90% level of confidence and with a 10% margin of error while determining the sample size for the monitoring survey by CPA implementers.

To determine the sample size, n, to be surveyed, the following formula as proposed by POA-DD and CPA-DDs was used by the CPA implementers.

$$n = \frac{z^2}{r^2} \frac{1-p}{p}$$

Where,

n = sample size

z = confidence level at 90% (standard value of 1.645)

r = margin error at 10%

p = estimated proportion of project CFLs installed and not working under the CPA (ex-ante calculated value for year 1 is 6.39% based on 10,000 hours of rated operating life of CFLs)

Thus, the sample size, n –

$$n = (1.645)^2 / (0.1)^2 * (1-p) / p$$

$$n = 270.6025 * (1-p) / p$$

$$\text{Hence, } n = 270.6025 * (1 - 0.0639) / 0.0639 = 3,964.1784 = 3,965 \text{ CFLs (roundup value)}$$

The above-mentioned formula as mentioned in the Annex 4 of registered PoA-DD<sup>B04/</sup> and respective CPA-DDs was consistently applied by investors for all the implemented CPAs under this MR. Verification team confirms that the actual number of CFLs sampled during the first ex post monitoring survey as mentioned in Annexure-2 of the MR<sup>P02/</sup> for each implemented CPAs is more than the estimated value as per the above mentioned formula.

Thus, the PP applied sample size meets the required level of confidence/precision in accordance with the methodology in accordance with §22 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0).

The CPA implementers has carried out the first ex post monitoring survey and designed the sampling plan<sup>/P23/</sup> in accordance with the registered PoA DD<sup>/B04/</sup>. The 1<sup>st</sup> ex post monitoring survey was carried out by adapting the questionnaire template as prescribed in Annex 1 of the applied methodology<sup>/B01/</sup>. Verification team checked the same from monitoring survey forms<sup>/P17/</sup> used by surveyor.

As per the registered sampling plan the number of representative households surveyed on random basis were much lower than the actual number of households surveyed during the 1<sup>st</sup> ex post monitoring survey conducted by CPA implementers. Verification team has independently checked the calculation of optimal sample size applying the formula as per registered PoA DD<sup>/B04/</sup> and found the sample size is reproducible. The sample size selected also confirms the desired 90% level of confidence and with a 10% margin of error. Hence, the verification team confirms that the 1st ex post survey carried out by CPA implementers is in accordance with §22 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0)<sup>/B13/</sup>.

#### **Sampling approach applied by verification team for cross verification:**

In accordance with the §24(a) of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0)<sup>/B13/</sup> and based on verification team’s professional judgment, the verification team has chosen a random sample size of 569 households (which is having 1,829 CFL) against the electronic database<sup>/P13/</sup>. The selected samples include a randomly selected households located in the aforementioned states of various divisions/ circles of the state Electricity Boards.

Further, the verification team has confirmed the following sampling approach-

- The sample size is based on the Acceptable Quality Level (AQL) of 1% and Unacceptable Quality Level (UQL) as 10% (as per §24b and §25 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0)).
- The sample size considered appropriate as the Table 1 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0)<sup>/B13/</sup> has already provided the sample size for verifying PP’s data to be 61, for AQL=1% and UQL=10%.
- The maximum errors associated with the determination indicated in §25 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0) is considered as 5% for producer’s risk and 5% for consumer’s risk.

Based on the sampling approach the verification team has selected the 569 household’s located in the implemented CPAs of three states. The verification team used the survey forms as shown in the Annexure-1 of this report to get the feedback from individual households during the on-site visit. The numbers of CFL sampled in the household were cross verified with the installed CFLs mentioned in the electronic database<sup>/P13/</sup> as well as from back up data of surveyed Households during First ex-post monitoring survey<sup>/P22/</sup> to confirm the correctness of the data gathered at the time of survey. The result of verification team’s observation based on the chosen sample, are found consistent with the CFL distribution database of the CPA implementers. No discrepancy was found during on site visit. Thus, according to the result of verification team’s random sampling as a part of the on-site visit, it is confirmed that the number of CFLs distributed as per CPA implementers’ electronic database records are appropriate. On site assessment includes in particular the cross verification of the ex post sampling survey back up data<sup>/P22/</sup> to confirm the electronic database<sup>/P13/</sup> provided to the verification team and no discrepancy found in samples verified.

In line with the requirements of §24 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0), verification team has visited a total of 569 households during the site visit and has found PPs survey records to be acceptable within the limits required as per Table 1 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0)<sup>/B13/</sup> which defines the sample size of 61.

The summary of the statistical survey carried out by the verification team during on site visit is presented below:

**Table 6: Summary of verification team on-site survey**

CPA UNFCCC Ref. No.	CFLs Distributed as per electronic database <sup>/P13/, /P22/</sup>				ICLs Collected as per electronic database <sup>/P13/, /P22/</sup>			
	11W	14W	18W	20W	60 W	60 W	100 W	100 W
3223-0001	-	14	-	62	-	14	-	62
3223-0029	27	-	90	-	27	-	90	-
3223-0031	50	-	50	-	50	-	50	-
3223-0032	-	44	-	37	-	44	-	37
3223-0036	39	-	110	-	39	-	110	-
3223-0037	30	-	94	-	30	-	94	-
3223-0038	39	-	80	-	39	-	80	-
3223-0039	40	-	101	-	40	-	101	-
3223-0041	34	-	73	-	34	-	73	-
3223-0043	45	-	67	-	45	-	67	-
3223-0044	25	-	52	-	25	-	52	-
3223-0045	54	-	48	-	54	-	48	-
3223-0046	24	-	97	-	24	-	97	-
3223-0047	65	-	83	-	65	-	83	-
3223-0048	63	-	39	-	63	-	39	-
3223-0049	32	-	63	-	32	-	63	-
3223-0050	10	-	48	-	10	-	48	-
<b>TOTAL</b>	<b>577</b>	<b>58</b>	<b>1095</b>	<b>99</b>	<b>577</b>	<b>58</b>	<b>1095</b>	<b>99</b>

Table 7: Summary of LFR<sub>i,y</sub> observed by verification team during on-site survey

CPA UNFCCC Ref. No.	CFLs found fused/broken during on site visit <sup>/B17/</sup>				LFR observed during on site visit (%)				Remarks on observed LFR compared to ex ante LFR assumed during on site visit
	11W	14W	18W	20W	11W	14W	18W	20W	
3223-0001	-	2	-	11	-	14.29	-	17.74	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0029	5	-	17	-	18.52	-	18.89	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0031	9	-	8	-	18.00	-	16.00	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0032	-	8	-	7	-	18.18	-	18.92	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0036	7	-	20	-	17.95	-	18.18	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0037	5	-	16	-	16.67	-	17.02	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0038	4	-	10	-	10.26	-	12.05	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.

3223-0039	5	-	12	-	12.50	-	11.88	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0041	4	-	9	-	11.76	-	12.33	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0043	6	-	9	-	13.33	-	13.43	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0044	4	-	9	-	16.00	-	17.31	-	Lower than the ex ante LFR assumed during 3 <sup>rd</sup> year (i.e. 19.18%) from completion of CFL distribution.
3223-0045	6	-	6	-	11.11	-	12.50	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0046	2	-	9	-	8.33	-	11.34	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0047	7	-	9	-	10.77	-	10.84	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0048	7	-	4	-	11.11	-	10.26	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0049	3	-	7	-	9.38	-	11.11	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.
3223-0050	1	-	6	-	10.00	-	12.50	-	Lower than the ex ante LFR assumed during 2 <sup>nd</sup> year (i.e. 12.78%) from completion of CFL distribution.

Thus, the verification team confirms that the ex-ante LFR value assumed for estimation of emission reduction (i.e. ex-ante LFR value of 12.78% for the 2<sup>nd</sup> year and for year 3 LFR applied is 19.18% from completion of distribution) is found to be appropriate.

#### Collection and destruction of the working ICLs

The working ICLs removed after the installation of CFLs has been collected by the CFL distribution team of CPA implementers. Verification team has cross checked the number of working ICLs collected through the certificate of handing over/ taking over issued by the ICL destruction agencies<sup>/P10b/</sup>. The verification team has noted that the number of each type of ICLs was the same as that of each type of distributed CFLs as per the electronic database<sup>/P13/</sup>. The ICLs collected were stored in respective boxes based on the wattage type and send to the various destruction

agencies<sup>/P08/</sup> designated by CQC for the destruction. On receiving the ICLs, the waste management company acknowledged the receipt of working ICLs and issued "Certificate of Destruction"<sup>/P10a/</sup>. A warranty program during the monitoring survey has also been provided by the CQC to the CFLs recipients in case of non operation of distributed CFLs within 1 year of the date of installation of CFLs. Verification team checked the same through the circle wise CFL replacement data as mentioned in the electronic database<sup>/P13/</sup> during on site visit.

The disposal of the fused CFLs has not yet happened and will be carried out in environmentally friendly manner in future as per the applicable standard of Ministry of Environment & Forests, Government of India<sup>/B09c/</sup>. Since there are no active guidelines about CFL disposal, the replaced/fused CFLs are presently stored in the respective divisions/ circle offices and will be disposed off during the project life time in accordance with the applicable standards / law of Ministry of Environment & Forests, Government of India.

### Management and Operation

The CPA implementers has implemented and operated the PoA as per the registered monitoring plan as mentioned in the PoA DD<sup>/B04/</sup>. The operation of the CFL distribution process was organised by BEE and CFLs were distributed on door to door distribution mode. The information on the exchange of bulbs at the household was recorded using electronic database<sup>/P13/</sup>. Each Staff member involved in the PoA has been provided adequate training<sup>/P21/</sup> about PoA activity before starting of distribution of CFLs.

The overall planning, management and operation is controlled by the CQC, Principal project owner & implementer for the project and BEE (i.e. CME). The management team of CQC has applied all the procedures, databases, infrastructure for smooth roll out of the CFLs distribution in exchange of right ICLs (i.e. distribution of 11W and 14W CFL for 60W ICL and 18W and 20W CFL for 100W ICL) and the destruction of ICLs surrendered by the users.

CQC has followed the monitoring plan as mentioned in the registered PoA-DD<sup>/B04/</sup> to ensure high integrity of data and quality of verification reports.

### Comparison of actual emission reductions with the estimated emission reductions:

The actual emission reductions achieved for the monitoring period are 40.35% lower than the estimated emission reductions stated in the registered CPA DDs<sup>/B04/</sup>. This is due to the fact that the projected figure was total 8,081,148 numbers of CFLs in the 17 implemented CPAs as mentioned in the registered CPA-DDs<sup>/B04/</sup> and the distributed figure is total 5,232,240 CFLs<sup>/P04/</sup>. The comparison has been provided below:

Monitoring period	Total Emission reductions as per the registered CPA-DDs for 17 implemented CPAs (tCO <sub>2</sub> e)	Total Actual values achieved for 17 implemented CPAs (tCO <sub>2</sub> e)
01/01/2013 to 31/10/2013 (Both dates included)	565,538	337,340

**Table 8: Comparison of actual ERs achieved and estimated ERs as per registered CPA-DDs**

UNFCCC Ref. No.	CPA specific Monitoring period length in number of days	Actual Emission Reduction (tCO <sub>2</sub> e)	Projected Emission Reduction as per CPA-DD(tCO <sub>2</sub> e)	Remarks on difference between estimated and actual emission reductions
3223-0001	304	26,027	35,076	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0029	304	17,800	34,480	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0031	304	8,169	32,346	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0032	304	26,274	35,885	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0036	304	22,348	36,744	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0037	304	18,594	34,272	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0038	304	26,634	41,561	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0039	304	29,645	34,270	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0041	304	24,709	35,778	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0043	304	12,561	28,396	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0044	304	14,537	32,485	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0045	304	21,478	41,722	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the



				projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0046	304	15,973	20,428	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0047	304	15,677	25,780	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0048	304	22,914	39,139	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0049	304	15,587	23,474	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>
3223-0050	304	18,413	33,704	The difference is due to the less number of CFLs distributed due to less number of participating households compared to the projected number of households in registered CPA-DD <sup>/B04/</sup>

#### Findings:

CAR-01, CL-02, CAR-03(d), CAR-03(e), CL-05 & CAR-04 has been raised in this context and closed satisfactorily. Please refer Section 7 of this report for detailed findings.

#### Opinion:

The verification team confirms that in the current monitoring period -

- The seventeen (17) number of CPAs out of twenty one (21) CPAs covered under this verification report were implemented as of 31/10/2013 (end date of this monitoring period). The same was verified during the site inspection and found to be correct confirming the implementation and operation of the PoA. The status of four (4) CPAs which were not implemented during this monitoring period has been given in detail in Table 5, section 3.2 of this report.
- There is no deviation, revision in monitoring plan or notification/request for approval for the changes from the description in the registered PoA-DD and CPA-DDs <sup>/B04/</sup> in the current monitoring period. The sample size selected also confirms the desired 90% level of confidence and with a 10% margin of error. Hence, the 1st ex post survey carried out by CPA implementers is in accordance with §22 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.0) <sup>/B13/</sup>.
- Verification team by means of an on-site visit confirms that all the physical features of the project activity in the registered PoA-DD were in place and that the project participants have operated the project activity as per the registered PoA-DD, CPA-DDs. DOE also confirms that there is no gap between the information stated in the registered PoA-DD, CPA-DDs and the monitoring report. Verification team confirms that the requirements of §227 of the VVS V5 <sup>/B06a/</sup> has been met.
- In accordance with §228 of VVS V5 <sup>/B06a/</sup> the verification team reviewed the registered PoA-DD, CPA-DDs <sup>/B04/</sup>, including the monitoring plan and the corresponding validation report <sup>/B05a/</sup>, the applied monitoring methodology <sup>/B01/</sup>, first MP verification report <sup>/B05c/</sup>, relevant decisions from the CMP and the CDM EB and found that the MR <sup>/P02/</sup> for this monitoring period is line with all the above mentioned documents.
- The estimated emission reductions for the PoA for comparable period (304 days) is 565,538 tCO<sub>2</sub>e while the actual emission reductions achieved during the monitoring period are 337,340 tCO<sub>2</sub>e.

### 3.3 Compliance of monitoring plan with the monitoring methodology including applicable tool(s)

#### Discussion:

The monitoring plan of the PoA is in accordance with the applied methodology<sup>/B01/</sup>. The monitoring has been carried out in accordance with the monitoring plan contained in the Registered PoA-DD<sup>/B04/</sup>. All parameters stated in the monitoring plan and the applied methodology has been fulfilled in the current monitoring period. All parameters used for emission reductions calculation have been verified and found satisfactory. The discussion regarding each parameter has been elaborated in the further sections of this report. The monitoring plan as mentioned in the Registered PoA-DD<sup>/B04/</sup> of the PoA is in accordance with the applied methodology<sup>/B01/</sup>.

The monitoring approach for each parameter described in the Registered PoA-DD<sup>/B04/</sup> was found consistent in terms of unit, measurement procedures and monitoring frequency.

#### Opinion:

In the opinion of the verification team the monitoring of the implemented CPAs has been carried out in accordance with the monitoring plan contained in the Registered PoA-DD<sup>/B04/</sup>. Monitoring plan as mentioned in the Registered PoA-DD<sup>/B04/</sup> complies with the requirement of the applied methodology AMS-II.J. (Version 03)<sup>/B01/</sup> in the context of the project activity. Thus, it conforms to the requirement of §232 of VVS V5<sup>/B06a/</sup>.

### 3.4 Post registration changes, if any

#### Discussion:

No Post Registration Changes are envisaged during this monitoring period. Therefore, this section is not applicable.

### 3.5 Compliance of monitoring activities with registered monitoring plan

#### Discussion:

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PoA-DD<sup>/B04/</sup> and registered CPA-DDs<sup>/B04/</sup>. During the verification all relevant monitoring parameter have been verified with regard to the appropriateness of the verification method, the correctness of the values applied for ER calculation, the accuracy, and applied QA/QC measures. It is confirmed that the monitoring parameter has been measured / determined without material misstatements.



**Table 9: Final Verified values of individual implemented CPAs (17 number)**

Parameter CPA UNFCCC Ref. No.	Q <sub>PJ,i</sub>	LFR <sub>i,y</sub>		N	P <sub>i,BL</sub>	P <sub>i,PJ</sub>	N <sub>destroyed</sub>		TD <sub>y</sub>	
		LFR <sub>i,1/(2)</sub>	LFR <sub>i,2/(3)</sub>				60W	100W	2012 -13	2013 -14
3223-0001	417,511	12.79%	19.18%	1,800	86.97	17.07	140,515	290,732	15.88%	15.63%
3223-0029	245,394	6.39%	12.78%	1,546	89.76	16.20	67,185	194,306	17.41%	17.37%
3223-0031	107,834	6.39%	12.78%	1,246	91.88	16.58	22,751	89,256	17.41%	17.37%
3223-0032	400,942	6.39%	12.78%	1,246	84.43	16.50	161,881	253,945	17.41%	17.37%
3223-0036	311,086	6.39%	12.78%	1,404	89.83	16.22	81,825	240,487	18.00%	17.00%
3223-0037	250,561	6.39%	12.78%	1,574	91.22	16.46	55,381	197,000	18.00%	17.00%
3223-0038	336,768	6.39%	12.78%	1,404	92.73	16.73	62,700	282,181	18.00%	17.00%
3223-0039	378,906	6.39%	-	1,404	91.62	16.53	80,369	303,123	18.00%	17.00%
3223-0041	331,494	6.39%	12.78%	1,404	89.15	16.10	91,055	244,558	18.00%	17.00%
3223-0043	181,697	6.39%	12.78%	1,741	88.77	16.03	52,854	135,388	15.88%	15.63%
3223-0044	216,780	6.39%	12.78%	1,741	88.14	15.92	64,651	153,377	15.88%	15.63%
3223-0045	302,288	6.39%	12.78%	1,741	89.60	16.18	80,228	228,392	15.88%	15.63%
3223-0046	378,604	6.39%	-	1,741	95.71	17.25	41,014	341,742	15.88%	15.63%
3223-0047	279,330	6.39%	-	1,741	90.29	16.30	68,418	213,349	15.88%	15.63%
3223-0048	319,238	6.39%	-	1,741	90.02	16.25	80,608	242,571	15.88%	15.63%
3223-0049	401,295	6.39%	-	1,741	88.69	16.02	114,991	291,727	15.88%	15.63%
3223-0050	257,391	6.39%	12.78%	1,741	91.55	16.52	56,759	212,064	15.88%	15.63%

### 3.5.1. Data/Parameter, Unit: N<sub>Destroyed</sub>, Number

Number of ICLs collected and destroyed

	Discussion and verification assessment
Purpose of data	For emission reduction calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	No monitoring equipment used.
Measuring/Reading/Recording frequency	Once in the crediting period. The data is recorded in electronic database from start date of CFL distribution up to the end date of CFL distribution for each CPA.
Data collection (from data generation, aggregation, to recording, calculation and reporting)	The data is recorded in consent deeds <sup>/P25/</sup> at the time of CFL distribution to the individual household. Number of working ICLs collected against each CFL distributed is recorded in the consent deeds <sup>/P25/</sup> at every location along with the date of distribution of CFLs for each household. After completion of distribution of CFLs the data is transferred in electronic database (excel sheet) at CPA level and reported to CME.
Verified value	As mentioned in table above in section 3.5 of this report.
Cross checks	The verification team cross checked the reported data in the MR <sup>/P02/</sup> and ER sheet <sup>/P04/</sup> with the electronic database <sup>/P13/</sup> . Also confirmed the same through the ICL destruction certificate issued by various destruction agencies for individual CPAs <sup>/P10/</sup> .
QA/QC procedures applied	The handing over of working ICLs and destruction activities were recorded via video recorder and/or photography <sup>/P09/</sup> . Verification team checked the same and found correct. After completion of CFL distribution activity, ICLs collected were stored in separate boxes according to the wattage and clearly labeled of their contents. Destruction of ICLs were organized by qualified independent service provider <sup>/P08/</sup> and total number of ICLs destroyed is verified through ICL

	destruction certificate issued by various destruction agencies for individual CPAs <sup>/P10/</sup> .
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#### Opinion:

The verification team checked the ICL destruction certificate issued by various destruction agencies for individual CPAs<sup>/P10/</sup> and also checked the photographic and video graphic evidences of boxes storing working ICLs with labelling of contents, wattages and destruction of ICLs<sup>/P09/</sup>. Verification team confirms that the value of parameter considered from certificates of ICL destruction as mentioned in the table above in section 3.5 of this report is acceptable.

#### 3.5.2. Data/Parameter, Unit: $Q_{PJ, h}$ Number

Number of CFLs of the group of "r" CFLs (11W, 14W, 18W & 20W CFLs) in operation during the first 12 months of distribution

	Discussion and verification assessment
Purpose of data	For emission reduction calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	No monitoring equipment used.
Measuring/Reading/Recording frequency	Once in the crediting period (within 1 year from end date of distribution of CFL for each CPA). The data is recorded in electronic database from start date of CFL distribution up to the end date of CFL distribution for each CPA. Value also confirmed from ex post Monitoring survey conducted after completion of distribution of CFLs.
Data collection (from data generation, aggregation, to recording, calculation and reporting)	The data is recorded in consent deeds <sup>/P25/</sup> at the time of CFL distribution to the individual household. Number of each type of CFL distributed is recorded in the consent deeds <sup>/P25/</sup> at every location along with the date of distribution of CFLs for each household. After completion of distribution of CFLs the data is transferred in electronic database (excel sheet) at CPA level and reported to CME.
Verified value	As mentioned in table above in section 3.5 of this report.
Cross checks	The verification team cross checked the reported data in the MR <sup>/P02/</sup> and ER sheet <sup>/P04/</sup> with the confirmation letter issued by CPA implementer to CME <sup>/P20/</sup> . Also confirmed the same through the ex post monitoring survey report <sup>/P15/</sup> .
QA/QC procedures applied	After completion of CFL distribution activity monitoring survey was conducted by qualified and experience ISP. Monitoring survey conducted in accordance with the requirement of methodology <sup>/B01/</sup> so that the estimate of $Q_{PJ, h}$ obtained is unbiased and reliable. The lower value between number of ICLs collected & destroyed and CFLs found in ex post monitoring survey is considered for ER calculation <sup>/P04/</sup> . This is a conservative approach. Also, it is confirmed that only the fused CFLs, which were replaced under warranty period and prior to the monitoring survey were counted as operating.

#### Opinion:

The verification team checked the ICL destruction certificate issued by various destruction agencies for individual CPAs<sup>/P10/</sup>. Verification team can confirm that the value of parameter considered as equal to the number of ICLs destructed<sup>/P10/</sup> is less/more than the value of CFLs found installed and operating as per ex post monitoring survey report<sup>/P15/</sup>. The lower value between number of ICLs collected & destroyed and CFLs found in ex post monitoring survey is considered for ER calculation<sup>/P04/</sup>. This is also in accordance with the QA/QC procedure mentioned in the registered PoA-DD and CPA-DDs<sup>/B04/</sup>.

### 3.5.3. Data/Parameter, Unit: $P_{i, BL}$ , W

Rated power of the baseline ICLs of the group of "I".

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	For emission reduction calculation.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring equipment used.
<i>Measuring/Reading/Recording frequency</i>	Measured once during the crediting period. Weighted average calculated using rated power of the baseline ICLs as recorded in CPA electronic database <sup>/P13/</sup>
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	The data of collected working ICLs is recorded in consent deeds <sup>/P25/</sup> at the time of CFL distribution to the individual household. After completion of distribution of CFLs the data is transferred in electronic database (excel sheet) at CPA level and reported to CME. Final value of number of ICLs collected and destructed is taken from ICL destruction certificate issued by various destruction agencies for individual CPAs <sup>/P10/</sup> . $P_{i, BL} = 60 \text{ W} \times \text{fraction of } 60 \text{ W ICLs destructed} + 100 \text{ W} \times \text{fraction of } 100 \text{ W ICLs destructed}$
<i>Verified value</i>	As mentioned in table above in section 3.5 of this report.
<i>Cross checks</i>	The verification team cross checked the calculation of parameter in the ER spread sheet <sup>/P04/</sup> with the values of number of ICLs collected as per ICL destruction certificate issued by various destruction agencies for individual CPAs <sup>/P10/</sup> . Also, the value is found conservative compared to the number of CFLs distributed as per the electronic database <sup>/P13/</sup> .
<i>QA/QC procedures applied</i>	Number and type of ICLs were collected in the boxes. In accordance with the collected ICLs, various destruction agencies issued destruction certificate <sup>/P10/</sup> to verify the numbers of ICLs collected which is mentioned in the electronic database <sup>/P13/</sup> .

#### Findings:

CAR-03 (c) has been raised in this context. Please refer Section 7 of this report for detailed finding.

#### Opinion:

The verification team checked the ICL destruction certificate issued by various destruction agencies for individual CPAs<sup>/P10/</sup>. Verification team can confirm that the value of parameter calculated based on values of number of ICLs destructed as per certificates of ICL destruction as mentioned in table above in section 3.5 of this report is acceptable.

### 3.5.4. Data/Parameter, Unit: $P_{i, PJ}$ , W

Rated power of the CFLs of the group of "I" lighting devices (Watts).

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	For emission reduction calculation.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring Equipment used.
<i>Measuring/Reading/Recording frequency</i>	Measured once during the crediting period. Weighted average calculated using rated power of the project CFLs as recorded in CPA electronic database <sup>/P13/</sup>
<i>Data collection (from data generation, aggregation, to</i>	The data of distributed CFLs of each type is recorded in consent deeds <sup>/P25/</sup> at the time of CFL distribution to the individual household. After completion of distribution of CFLs the data is transferred in

<i>recording, calculation and reporting)</i>	electronic database (excel sheet) at CPA level and reported to CME. Final value of number of each type of CFL distributed is taken from lower value between number of ICLs collected & destroyed and CFLs found in ex post monitoring survey is considered for ER calculation <sup>/P04/</sup> . $P_{i, PJ} = (11 \text{ W} \times \text{fraction of 11 W CFLs distributed}) + (14 \text{ W} \times \text{fraction of 14 W CFLs distributed}) + (18 \text{ W} \times \text{fraction of 18 W CFLs distributed}) + (20 \text{ W} \times \text{fraction of 20 W CFLs distributed})$
<i>Verified value</i>	As mentioned in table above in section 3.5 of this report.
<i>Cross checks</i>	The verification team cross checked the calculation of parameter in the ER spread sheet <sup>/P04/</sup> with the values of number of CFLs as per the confirmation letter issued by CPA implementer to CME <sup>/P20/</sup> .
<i>QA/QC procedures applied</i>	Number and type of CFLs purchased and delivered to CPA implementers was used to verify the number recorded in the electronic database <sup>/P13/</sup> . This was also cross referred to the ICLs collected as per ICL destruction certificate issued by various destruction agencies for individual CPAs <sup>/P10/</sup> .

#### Opinion:

The verification team checked the CFLs distribution electronic database<sup>/P13/</sup> as well as the confirmation letter issued by CPA implementer to CME<sup>/P20/</sup>. Verification team can confirm that the value of parameter calculated based on lower value between number of ICLs collected & destroyed and CFLs found in ex post monitoring survey<sup>/P15/</sup> as mentioned in table above in section 3.5 of this report is acceptable.

#### 3.5.5. Data/Parameter, Unit: “Lamp distribution data” , --

The start and completion date of CFL distribution, Utility consumer number of CFL recipient households under the SSC-CPA entered into the SSC-CPA database.

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Data is to verify number of ICLs replaced and whether the recipient is from implemented CPA project area.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring Equipment used.
<i>Measuring/Reading/Recording frequency</i>	The details of each CFL recipient is recorded from start date of CFL distribution up to end date of CFL distribution in electronic database <sup>/P13/</sup> . Information has been recorded in the consent deeds <sup>/P25/</sup> during CFL distribution consisting of name of the recipient, address, and electricity consumer number (unique identification).
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	The data is recorded in consent deeds <sup>/P25/</sup> at the time of CFL distribution to the individual household. After completion of distribution of CFLs the data is transferred in electronic database (excel sheet) at CPA level and reported to CME for record.
<i>Verified value</i>	-
<i>Cross checks</i>	The verification team cross checked the information of the visited households during the on-site visit against the electronic database <sup>/P13/</sup> as well as from back up data of surveyed households during 1 <sup>st</sup> ex post monitoring survey conducted by CPA implementers <sup>/P15/</sup> .
<i>QA/QC procedures applied</i>	The date of CFL distribution from electronic database <sup>/P13/</sup> was cross verified from the consent deeds <sup>/P25/</sup> on sample basis.

#### Opinion:

The verification team confirmed the same during on-site visit for sampled households against the entry in electronic database<sup>/P13/</sup>. Verification team can confirm that the unique identification of each household (CFL recipient) is correct.

### 3.5.6. Data/Parameter, Unit: N, --

#### Sample size of Monitoring Survey

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Data is to verify number the correctness of the sample size considered during the ex post monitoring survey conducted by the CPA implementers.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring Equipment used.
<i>Measuring/Reading/Recording frequency</i>	Calculated once at the time of each monitoring survey.
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	Calculated as mentioned in the Annexure 4 of respective CPA-DDs <sup>/B04/</sup>
<i>Verified value</i>	As mentioned in table above in section 3.5 of this report.
<i>Cross checks</i>	The verification team cross checked the sample size considered by CPA implementers during 1 <sup>st</sup> ex post monitoring survey <sup>/P15/</sup> from the value of sample size mentioned in the registered CPA-DDs <sup>/B04/</sup> .
<i>QA/QC procedures applied</i>	Each SSC-CPA determined the representative sample size with minimum 90% confidence interval and 10% maximum error margin. The actual number of households to be surveyed was arrived at by dividing the number of sample CFL with the average number of CFLs distributed per household. To be conservative the minimum number of households surveyed was kept as hundred (100). The CPA implementer(s) has chosen a sample size higher than the one calculated in individual CPA-DDs <sup>/B04/</sup> .

#### Opinion:

Assessment team confirms that the value of parameter “sample size of monitoring survey” for each CPA given in the ER spread sheet<sup>/P04/</sup> is considered as higher than the estimated value in registered CPA-DDs<sup>/B04/</sup> in order to reduce the error margin and achieve more accurate survey results. The assumption taken by CPA implementers is on the conservative side and hence acceptable.

### 3.5.7. Data/Parameter, Unit: $LFR_{i,y}$ , %

#### Lamp Failure Rate for CFL type i in year y (fraction).

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	For emission reduction calculation.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring Equipment used.
<i>Measuring/Reading/Recording frequency</i>	Monitored through subsequent ex post monitoring surveys which will take place in 3 years interval after the first ex post monitoring survey (within 1 year of completion of CFL distribution) which was conducted by CPA implementers on dates mentioned in the section 3.2 of this report.
<i>Data collection (from data generation,</i>	Ex post $LFR_{i,y}$ is determined by dividing the number of fused CFLs determined at the ex post monitoring survey by the number of CFLs



<i>aggregation, to recording, calculation and reporting)</i>	distributed by the project activity ( $Q_{PJ,i}$ ) determined by first ex post monitoring survey. The calculated LFR value is then compared with the <i>ex ante</i> LFR which is calculated using the formula provided in methodology <sup>/B01/</sup> . Lower value of the <i>ex ante</i> LFR and <i>ex post</i> LFR is considered for ER calculation.
<i>Verified value</i>	As mentioned in table above in section 3.5 of this report.
<i>Cross checks</i>	The verification team cross checked the reported data in the MR <sup>/P02/</sup> and ER spread sheet <sup>/P04/</sup> with the <i>ex post</i> monitoring survey report <sup>/P15/</sup> . The LFR observed during sampling survey as part of on-site visit is lower than the <i>ex-ante</i> value considered for ER calculation. Also checked the SSC WG clarification number "SSC 354" <sup>/B19/</sup> , which clarifies that in the absence of the mortality curve developed in accordance with a national or international standard, the <i>ex post</i> LFR obtained from the monitoring survey shall only be used to confirm the <i>ex ante</i> LFR or increase in the <i>ex ante</i> LFR.
<i>QA/QC procedures applied</i>	To obtain a reliable estimate LFR, sampling size of the survey is determined by minimum 90% confidence interval and maximum 10% error margin. The PP considered higher number of households for the first <i>ex post</i> monitoring survey compared to the sample size calculated based on the Annexure-4 of registered CPA-DDs <sup>/B04/</sup> . The larger sample size also offered a better representation of the entire sample (as it reduced sampling error). Refer section 3.2 of this verification report.

#### Opinion:

The verification team checked the first *ex post* monitoring survey report<sup>/P15/</sup> as well as *ex ante* estimate of  $LFR_{i,y}$  in ER spread sheet<sup>/P04/</sup>. Verification team confirms that the sample size of households considered by CPA implementers is appropriate and the value of parameter applied as *ex ante* value (for year 1, LFR applied is 6.39%, for year 2 LFR applied is 12.78% and for year 3 LFR applied is 19.18%) is conservative compared to the value found during first *ex post* monitoring survey<sup>/P15/</sup> which is in line with SSC-354<sup>/B19/</sup>.

#### 3.5.8. Data/Parameter, Unit: $TD_y$ , %

Average annual technical grid losses.

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	For emission reduction calculation.
<i>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</i>	No monitoring Equipment used.
<i>Measuring/Reading/Recording frequency</i>	Data taken from publicly available tariff order documents corresponding to the monitoring period as per the web links mentioned in the ER spreadsheet <sup>/P04/</sup> .
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	The data is recorded yearly, based on publicly available tariff order documents, including actual T&D loss values submitted by electricity distribution companies (DISCOM) within the project area and approved by the electricity regulatory bodies that regulate these distribution companies. These tariff order documents are available on the websites of the state level electricity regulatory bodies and these web links are referred in the ER spreadsheet <sup>/P04/</sup> . These tariff orders correspond with the current monitoring period year (2012-13 and 2013-14) and hence are considered to be appropriate.
<i>Verified value</i>	As mentioned in table above in section 3.5 of this report.
<i>Cross checks</i>	The verification team cross checked the calculation of parameter in the ER spread sheet <sup>/P04/</sup> with the values of T&D losses declared by state level electricity regulatory bodies <sup>/B16/</sup> .

<i>QA/QC procedures applied</i>	The CME selected the T&D loss value for each CPA specific to individual electricity distribution companies within the CPA area, using the T&D loss values confirmed by the electricity regulatory commission in recent tariff order documents corresponding with the current monitoring period (2012-13 and 2013-14) published by electricity regulatory commissions that oversee these distribution companies.
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**Findings:**

CAR-03 (b) has been raised in this context. Please refer Section 7 of this report for detailed finding

**Opinion:**

The verification team checked the T&D losses value declared by respective state level electricity regulatory bodies<sup>/B16/</sup>. Verification team can confirm that the value of parameter considered as in table above in section 3.5 of this report is acceptable.

### 3.6 Compliance with the calibration frequency requirements for measuring instruments

**Discussion:**

No calibration requirement is applied as the project activity does not employ any monitoring equipment. Hence, this section is not applicable.

### 3.7 Data not monitored (ex ante or external parameters)

**3.7.1. Data/Parameter, Unit:  $EF_{CO_2,ELEC,y}$ , tCO<sub>2</sub>/MWh**

CO<sub>2</sub> emission factor for displacement of electricity in the respective Grid (viz. NEWNE and Southern) serving the household consumers that participate in the SSC-CPA project area during the monitoring interval y, calculated according to the latest approved version of AMS-I.D (tCO<sub>2</sub>/MWh)

	<i>Discussion and verification assessment</i>	
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)	
<i>Verified value</i>	SSC-CPA UNFCCC Ref No	Verified Value
	3223-0001	0.856
	3223-0029, 3223-0031, 3223-0032, 3223-0036, 3223-0037, 3223-0038	0.903
	3223-0039, 3223-0041	
	3223-0043 to 3223-0050	0.865
<i>Source of value</i>	The User Guide of CDM Baseline CO <sub>2</sub> emission database by Central Electricity Authority (CEA), India (versions 4.0, 5.0 and 6.0), as stated in respective registered CPA-DDs <sup>/B04/</sup>	
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup> and fixed ex-ante	

**3.7.2. Data/Parameter, Unit: O<sub>i</sub>, Hours / day**

Average daily operating hours of the baseline ICLs of the group of "I",

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)
<i>Verified value</i>	3.5 hours per 24 hours period
<i>Source of value</i>	Default Value as mentioned in the applied methodology <sup>/B01/</sup>
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup> and fixed ex-ante

**3.7.3. Data/Parameter, Unit: L<sub>i</sub>, Hours**

rated average operating hours for CFL type i

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)
<i>Verified value</i>	10,000 hours
<i>Source of value</i>	Life test reports of CFLs <sup>/P11/</sup>
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup> and fixed ex-ante

### 3.7.4. Data/Parameter, Unit: **High PF CFL life test report and test curves,-**

Life test reports of CFLs

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)
<i>Verified value</i>	Life Test Reports of all type of distributed CFLs have been verified and found acceptable <sup>/P11/</sup> .
<i>Source of value</i>	Life test reports obtained from accredited laboratory <sup>/P11/</sup>
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup>

### 3.7.5. Data/Parameter, Unit: **X<sub>i</sub>Hours/ year**

Operating hours per year for CFL type *i*

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)
<i>Verified value</i>	1,277.5 hours per 365 day year; 1,281 hours for leap year
<i>Source of value</i>	Calculated value
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup>

### 3.7.6. Data/Parameter, Unit: **NTG, -**

Net-to-gross adjustment factor

	<i>Discussion and verification assessment</i>
<i>Purpose of data</i>	Emission reduction calculation (Only the emission reduction formula is provided in the methodology)
<i>Verified value</i>	0.95
<i>Source of value</i>	Default Value as mentioned in the applied methodology <sup>/B01/</sup>
<i>Justification</i>	Consistent with the Registered CPA-DDs <sup>/B04/</sup> and fixed ex-ante

#### Discussion:

The values of **EF<sub>CO2,ELEC,y</sub>**, **O<sub>i</sub>**, **L<sub>i</sub>**, **X<sub>i</sub>** and **NTG** have been fixed *ex-ante* during registration of the PoA and respective CPAs. Accordingly, the values were checked and confirmed with the registered CPA DDs<sup>/B04/</sup>.

#### Findings:

CAR-03 (a) has been raised in this context. Please refer Section 7 of this report for detailed finding

#### Opinion:

The values of ex ante fixed parameters have been verified from the registered CPA-DDs<sup>/B04/</sup>. Same has been crosschecked with the source mentioned in the CPA-DDs and found to be consistent. The verification team confirms that the values used/applied are correct and justified. Also, the ex-ante values have been correctly applied in the calculation of emission reductions.

## 3.8 Assessment of Data & calculation of GHG Emission Reductions

#### Discussion:



### **Emissions Reduction ( $ER_y$ )**

Emission reduction ( $ER_y$ ) is net electricity savings ( $NES_y$ ) times an emission factor ( $EF_{CO2,ELEC,y}$ )

$$ER_y = NES_y \times EF_{CO2,ELEC,y} \quad (1)$$

Where:

$ER_y$  Emission reductions in year  $y$  (tCO<sub>2</sub>e)

$NES_y$  Net electricity saved in year  $y$  (kWh)

$EF_{CO2,ELEC,y}$  Grid Emission factor (GEF) in year  $y$  (tCO<sub>2</sub>e/MWh);  
The calculated GEF value is fixed ex-ante in the SSC-CPA.

### **Net Energy Savings ( $NES_y$ )**

The net energy saved is derived using the equation (2) below:

$$NES_y = \sum_i Q_{PJ,i} * (1 - LFR_{i,y}) * ES_i * [1 / (1 - TD_y)] * NTG \quad (2)$$

Where:

$$ES_i = (P_{i,BL} - P_{i,PJ}) * O_i * 365 / 1000 \quad (3)$$

Where:

$NES_y$  Net electricity saved in year  $y$  (kWh)

$Q_{PJ,i}$  Number (quantity) of CFLs of wattage “ $i$ ” distributed or installed under the project activity. In total for all “ $i$ ”, this value shall be equal to or less than the documented number of all baseline ICLs destroyed. Once all of the project CFLs are distributed or installed,  $Q_{PJ,i}$  is a constant value independent from  $y$ . Under the PoA,  $Q_{PJ,i}$  shall be obtained from the *ex post*  $Q_{PJ}$  survey, which is to take place within the first 12 months of CFL distribution.

$i$  Counter for lighting device type e.g. 40W incandescent bulb, 14 W CFL

$n$  Number of types of lighting devices

$ES_i$  Estimated annual electricity savings for equipment of type  $i$ , for the relevant technology viz. ICL or CFL(kWh)

$LFR_{i,y}$  Lamp Failure Rate for CFL equipment type  $i$  in year  $y$  (fraction). Under the PoA, this is calculated ex-ante using the equation (4) below and adjusted ex-post based on monitoring survey results.

$TD_y$  Average annual technical grid losses (transmission and distribution) during year  $y$  for the grid serving the locations where CFLs are installed, expressed as a fraction. Under the PoA, each CPA would determine the  $TD_y$  from the most recent average annual audited data published either by the DISCOM or an official governmental body e.g. by the Central Electricity Authority (CEA) of India, Electricity Regulatory Commission(s).  
A default value of 10% shall be used for average annual technical grid losses, if no recent data are available or the data cannot be regarded accurate and reliable.

$NTG$  Under the PoA, the default value of 0.95 is applied.

$P_{i,BL}$  Rated power of the baseline lighting devices (ICLs) of the group of type  $i$  lighting devices (Watts)

$P_{i,PJ}$  Rated power of the project lighting devices (CFLs) of the group of “ $i$ ” lighting devices(Watts)

$O_i$  Under the PoA, the value of 3.5 hours per 24 hrs period shall be applied in all SSC-CPAs.

**Table 10: Summary of the calculated values for 17 implemented CPAs**

Parameter CPA UNFCCC Ref. No.	Energy Saving by project CFL in each year (in KWh)		Net Energy Saved by Project CFL (in MWh)			Actual Emission Reduction (tCO <sub>2</sub> e)
	ES <sub>1(2)</sub>	ES <sub>2(3)</sub>	NES <sub>1(2)</sub>	NES <sub>2(3)</sub>	NES <sub>y</sub>	
3223-0001	68.75	5.63	28,268	2,138	30,406	26,027
3223-0029	25.48	52.75	6,731	12,982	19,713	17,800
3223-0031	48.23	31.89	5,600	3,448	9,048	8,169
3223-0032	1.19	71.09	513	28,584	29,097	26,274
3223-0036	15.72	62.62	5,303	19,447	24,750	22,348
3223-0037	32.18	47.36	8,746	11,847	20,593	18,594
3223-0038	79.53	1.33	29,049	447	29,496	26,634
3223-0039	79.89	0.00	32,830	0	32,830	29,645
3223-0041	57.52	20.20	20,681	6,684	27,365	24,709
3223-0043	52.19	25.20	10,025	4,497	14,522	12,561
3223-0044	27.55	49.29	6,314	10,494	16,807	14,537
3223-0045	72.21	5.91	23,077	1,755	24,832	21,478
3223-0046	46.14	0.00	18,467	0	18,467	15,973
3223-0047	61.37	0.00	18,124	0	18,124	15,677
3223-0048	78.49	0.00	26,490	0	26,490	22,914
3223-0049	42.48	0.00	18,020	0	18,020	15,587
3223-0050	57.25	22.58	15,578	5,709	21,288	18,413

**Opinion:**

The verification team confirms that –

- All data has been available and all the parameters have been monitored in accordance with the registered PoA-DD and CPA-DDs<sup>/B04/</sup>.
- The reported data have been cross-checked against other sources available as explained above in section 3.5 where applicable;
- The methods and formulae used to obtain the emission reductions are appropriate. The same has been done in accordance with the methods and formulae described in the registered monitoring plan<sup>/B04/</sup> and applicable methodology<sup>/B01/</sup>.
- The monitoring report includes all parameters and the monitored data at the intervals required by the methodology<sup>/B01/</sup> and PoA-DD<sup>/B04/</sup>.
- The emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report.
- The final MR template has all the information as prescribed in the valid standardized template and instruction to fill MR Version 4.0

### 3.9 Assessment of GHG Emission Reductions in first and second commitment period

Since, start and end date of the 2<sup>nd</sup> monitoring period of the PoA is starting from 01/01/2013 and ending on 31/10/2013. Hence, the total value of emission reduction achieved during the 2<sup>nd</sup> monitoring period is within the second commitment period.

Item	Actual values achieved up to 31 December 2012 (first commitment period)	Actual values achieved from 1 January 2013 onwards (second commitment period)
Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e)	-	337,340

### 3.10 Quality of Evidence to Determine Emission Reductions

The emission reduction of this project activity was determined based on the validated emission factor and ex ante lamp usage hours of 3.5 hours per day along with the number and the wattage of the CFL bulbs distributed in lieu of the ICL bulbs, Net-to-gross adjustment factor, actual lamp failure rate, T&D losses; from the following monitoring parameters. PP has submitted the electronic copy of the project database<sup>/P13/</sup> of the households which provides sufficient and appropriate information to cross check the CFL bulbs distributed in lieu of the ICL bulbs. The ex-post monitoring survey report<sup>/P15/</sup> is sufficient to cross check the actual lamp failure rate. The T&D losses were cross checked from relevant zone wise electricity regulatory authority website<sup>/B16/</sup>. The monitoring and reporting of data is in accordance with well-established operational procedures. The approved baseline methodology AMS-II.J., version 3-“Demand-side activities for efficient lighting technologies”<sup>/B01/</sup> has been applied for the project activity.

Based on the emission reduction from the CPAs have been verified to be 337,340 tCO<sub>2</sub> equivalent for the period 01/01/2013 to 31/10/2013 (both dates inclusive).

Evidences (Documents/interview/site visit) referred for verification of individual monitoring parameter and fixed parameters are defined in section 3.5 and section 3.7 respectively. It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in section 6 of this report.

#### Conclusion:

The verification team confirms that the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification and on site visit, the data submitted by CME was cross verified with the values mentioned in the emission reduction sheet<sup>/P04/</sup> and monitoring report<sup>/P02/</sup>. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the registered PoA-DD and CPA-DDs<sup>/B04/</sup>.

### 3.11 Management System and Quality Assurance

#### Discussion:

In order to ensure a successful operation of the PoA and individual CPAs and the credibility and verifiability of the ERs achieved, the CME has established a well-defined management and operational system<sup>/P19/</sup>. The project management procedures cover management responsibilities, data monitoring procedures, training procedures, management reviews and corrective actions in case of any deviations. The organizational structure, responsibilities, competencies, non-conformance handling and management review for the project was found to be adequate. The assessment team confirms that management and operational system, the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan of the registered PoA-DD and CPA-DDs<sup>/B04/</sup>.

The overall monitoring system under all the CPAs has been summarized in the figure 2 & 3 of section C of the Monitoring Report<sup>/P02/</sup>. Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India, being a CME has identified the responsible team to monitor all the CPAs and maintain the database for the following information:

- The list of participating household in the implemented CPAs with the unique identification no
- Record of the ICL collected (total number per CPA wise and wattage) and CFL distributed
- CFL type and wattage as per registered monitoring plan
- Record of the geographical location of the CPAs
- Maintaining the bilateral agreements with CPA investors

In addition to this CPA investors are monitoring the following:

- Ex-post survey of the all implemented CPAs through competent surveyors
- ICL collection and destruction records

- CFL distribution and maintain the records of the consent deeds with individual households
- Start date and end date of CFI distribution data CPA wise
- T&D loss calculation with the published data
- Emission reduction calculation and reporting to CME

The management system and control, internal audit procedures of the CPA investors were reviewed during the site visit, which establishes the operational and management structure implemented.

**Conclusion:**

The verification team hereby confirms that the responsibilities and authorities for monitoring and reporting of the PoA are in accordance with the monitoring plan as mentioned in the registered PoA-DD and CPA-DDs<sup>/B04/</sup>. The verification team also confirmed the formats for data mangement (electronic database) are verified on sample basis at the time of on site visit for all the implemented CPAs.

### **3.12 Application of Materiality**

**Discussion:**

In accordance with EB 69, Annex 06, paragraph 7(a), the “Guideline on the application of materiality in verifications” (Version 01.0)<sup>/B11/</sup> is not applicable for the verification of PoA.

#### **4. RECOMMEDATIONS / FORWARD ACTION REQUEST**

There is no recommendation/FAR raised during current verification for the Project activity.

## 5. VERIFICATION & CERTIFICATION STATEMENT

KBS Certification Services Pvt. Ltd. has been contracted by Bureau of Energy Efficiency to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the CDM PoA "CFL lighting scheme – "Bachat Lamp Yojana" and UNFCCC Ref. Number 3223 for the monitoring period 01/01/2013 up to 31/10/2013 (including both dates) in the Consolidated Monitoring Report Version 01 (first version) dated 30/06/2014. This verification report covers 21 out of 50 CPAs included under the PoA as on 31/10/2013.

The verification is based on the registered PoA-DD, CPA-DDs and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakech accord, as well as those defined by the CDM Executive Board.

The management of the Bureau of Energy Efficiency is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Delinked Monitoring Report Version 02.1 dated 10/12/2014. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the Bureau of Energy Efficiency. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 02.1 dated 10/12/2014.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the monitoring period 01/01/2013 up to 31/10/2013 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 02.1 dated 10/12/2014 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated. KBS confirms the following;

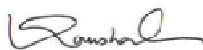
**Reporting period:** From 01/01/2013 up to 31/10/2013 (including both dates)

**Verified and certified emission in the above reporting period:**

	Amount	Unit
Certified emission reductions (CERs)	337,340	tCO <sub>2</sub> e

Location: Faridabad, Haryana, India

Date: 12/12/2014



Kaushal Goyal

Managing Director

KBS Certification Services Pvt. Ltd.

## 6. REFERENCES

### Documents submitted by the PP

Sr. No.	Documents
/P01/	Webhosted Consolidated Monitoring report version '01' dated 30/06/2014
/P02/	Final Delinked Monitoring report (Batch 1) version '2.1' dated 10/12/2014
/P03/	ER Calculation spread sheet corresponding to /P01/
/P04/	ER Calculation spread sheet corresponding to /P02/
/P05/	Verification contract between CME (BEE), Investors (CQC) and DOE (KBS Certification Services Private Limited)
/P06/	<ul style="list-style-type: none"> <li>Supply Agreement / Purchase Order between C-Quest Capital Malaysia Limited and CFL Manufacturers (HPL Electric &amp; Power Pvt. Ltd., Energetic Lighting India Private Limited and Halonix Limited)</li> </ul>
/P07/	<ul style="list-style-type: none"> <li>IS 15111-1 (2002): Self Ballasted Lamps for General Lighting Services, Part 1: Safety Requirements [ETD 23: Electric Lamps and their Auxiliaries]</li> <li>IS 15111-2 (2002): Self Ballasted Lamps for General Lighting Services, Part 2: Performance Requirements [ETD 23: Electric Lamps and their Auxiliaries]</li> </ul>
/P08/	<ul style="list-style-type: none"> <li>Full Scale ICL Collection and Disposal Agreements signed between C-Quest Capital Malaysia Limited and Global E-Waste Management and Services for CPAs implemented in Andhra Pradesh</li> <li>Full Scale ICL Collection and Disposal Agreements signed between C-Quest Capital Malaysia Limited and Indian Pollution Control Association for CPAs implemented in Delhi and Punjab</li> </ul>
/P09/	Photographic and video graphic evidences of <u>boxes storing ICLs</u> with <u>labelling of contents, wattages and destruction of ICLs</u> (for each CPA)
/P10/	<ol style="list-style-type: none"> <li>Certificate of ICL Collection and Destruction issued by ICL Destruction Agency for each CPA</li> <li>Certificate of Handing over/ taking over of ICLs issued by ICL Destruction Agency for each CPA</li> <li>Inventory list for Certificate of Handing of ICLs issued by ICL Destruction Agency for each CPA</li> <li>Certificate of Verification of Quantity of ICLs issued by ICL Destruction Agency for each CPA</li> </ol>
/P11/	<ul style="list-style-type: none"> <li>Life test reports issued by Central Electrical Testing Laboratory for 11W, 18W and 20W type Energetic CFLs</li> <li>Life test reports issued by Balaji Control for 11W and 18W type Glomore CFLs</li> <li>Life test reports issued by National Physical Laboratory for 11W and 18W type Halonix CFLs</li> </ul>

	<ul style="list-style-type: none"> <li>Life test reports issued by National Physical Laboratory for 14W and 20W type Phillips CFLs</li> </ul>
/P12/	Tri-partite agreements between BEE, Investors and DISCOM for each CPA
/P13/	Copy of the electronic database for each CPA containing list of each household that receives CFLs (Consumer number, house address, name of the occupant, DISCOM, date of distribution of CFLs, number & watt of each replaced ICL & each distributed CFLs) for each CPA
/P14/	ICL collection and CFL distribution procedure followed by Investors (for each CPA)
/P15/	<ul style="list-style-type: none"> <li>First ex-post monitoring survey reports determining monitoring parameters "<math>Q_{P,j,i}</math>" and "<math>LFR_{i,y}</math>" by Business and Industrial Research Division (BIRD) IMRB International for all CPA 3223-0001</li> <li>First ex-post monitoring survey reports determining monitoring parameters "<math>Q_{P,j,i}</math>" and "<math>LFR_{i,y}</math>" by Neosphere Ambiance Pvt. Ltd. for all CPAs in Delhi, Punjab and Andhra Pradesh</li> </ul>
/P16/	<p>Supportive evidences for T&amp;D Losses:</p> <p>Year 2012-13:</p> <ul style="list-style-type: none"> <li>"APSPDCL-Filing of ARR &amp; Proposed Tariffs for Retail Supply Business for FY 2014-15 (D=11.82%, Pg 5)</li> <li>APERC- TRANSMISSION TARIFFS For the period FY2009-10 to FY2013-14 (T=4.06%, Pg 6)"</li> <li>Tariff Order PSPCL 2013-14 (T&amp;D = 18.00%, Pg 16)</li> <li>Order on True Up for FY 2011-12, Aggregate Revenue Requirement and Distribution Tariff (Wheeling &amp; Retail Supply) (T=4.85%, Pg 212, D=12.56%, Pg 126)</li> </ul> <p>Year 2013-14:</p> <ul style="list-style-type: none"> <li>"APSPDCL-Filing of ARR &amp; Proposed Tariffs for Retail Supply Business for FY 2014-15 (D=11.61%, Pg 5)</li> <li>APERC- TRANSMISSION TARIFFS For the period FY2009-10 to FY2013-14 (T=4.02%, Pg 6)"</li> <li>Tariff Order PSPCL 2013-14 (T&amp;D = 17.00%, Pg 60)</li> <li>"Order on True Up for FY 2011-12, Aggregate Revenue Requirement and Distribution Tariff (Wheeling &amp; Retail Supply) (T=4.85%, Pg 212)</li> <li>DERC- Determination of Transmission and Wheeling Charges order dated 24.12.2013 (D=12.52%, Pg 23) "</li> </ul>
/P17/	Sample Copy of the Filled Survey Questionnaire used by surveyor during First ex-post monitoring survey (for each CPA)
/P18/	Photographic evidence of each type of installed CFL lamps showing unique identification (logo)
/P19/	Proof of operational & management structure for BLY PoA as per the diagram mentioned in the web hosted MR.



/P20/	<ul style="list-style-type: none"> <li>Supportive for CFL distribution start date and completion date for all CPAs of Delhi, Punjab and Andhra Pradesh respectively: <ul style="list-style-type: none"> <li>➤ Letter from CQC to BEE – “Application of closure of CPA no. under BLY-PoA and submission of SSC-CPA database”</li> <li>➤ Letter by BEE to CQC – “Acceptance of the End Date of CFL Distribution of CPA no. under BLY PoA”</li> </ul> </li> </ul>
/P21/	Training Record for persons involved in the distribution of CFLs conducted by Investors (CQC)
/P22/	Back up data for Q <sub>PJ,i</sub> survey and first LFR for each type of lamp
/P23/	First ex-post monitoring survey process flow sheet (extracted from monitoring survey report ) for each CPA
/P24/	Project implementation plan outlining the various procedures like delivery mechanism ,distribution, data to be recorded, ICL collection, storage and disposal etc.
/P25/	Sample copies of the consent deeds signed by the household consumers with CPA Implementer (Investor) forbidding them to re-sell the CFLs.
/P26/	<ul style="list-style-type: none"> <li>Letters issued by CME (BEE) to CPA implementer (CQC) dated 15/07/2013, 09/04/2013 and 20/09/2013 (CPA UNFCCC Ref. No. 3223-0046, 3223-0047, 3223-0049)</li> <li>Letter issued by CME (BEE) dated 29/11/2012 for two (2) unimplemented CPAs in Delhi (CPA UNFCCC Ref. No. 3223-0030, 3223-0033)</li> <li>Letter issued by CPA implementer (CQC) dated 02/05/2013 for two (2) unimplemented CPAs in Punjab (CPA UNFCCC Ref. No. 3223-0040, 3223-0042)</li> </ul>
/P27/	<ul style="list-style-type: none"> <li>Acceptance by UNFCCC regarding Revised Start date of Crediting period as proposed by implementer on 09/09/2013</li> </ul>

**Background investigation and other referred documents/websites:**

Reference	Document
/B01/	AMS-II.J. “ <u>Demand-side activities for efficient lighting technologies</u> ” (Version 3.0).
/B02/	Kyoto Protocol (1997).
/B03/	Decision 3/CMP.1, Decision 4/CMP.1 and Decision 1/CMP.2
/B04/	Registered POA –DD and included CPA-DDs for CDM project: “CFL lighting scheme – “Bachat Lamp Yojana”, UNFCCC PoA project reference no 3223
/B05/	a) Validation report for CDM PoA: “CFL lighting scheme – “Bachat Lamp Yojana”, UNFCCC PoA project reference no 3223 dated 25/03/2010

	<p>b) Validation reports for all CPAs included in the current monitoring period</p> <p>c) MP01 verification report for CPAs Implemented by CQC, HPL (Batch 1)</p>
/B06/	<p>a) Clean development mechanism validation and verification standard (Version: 05.0),</p> <p>b) Clean development mechanism project standard (Version: 05.0),</p> <p>c) Clean development mechanism project cycle procedure (Version: 05.0)</p>
/B07/	E-mail from CDM Secretariat confirming the Batch 1 monitoring report /P01/ made publically available from 09/07/2014.
/B08/	<p>UNFCCC project page of project reference number (3223):</p> <p><a href="http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/CZ59J1XMR8K4ELUS6WY3BA0IVTGQ2F/view">http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/CZ59J1XMR8K4ELUS6WY3BA0IVTGQ2F/view</a></p>
/B09/	<p>Websites referred:</p> <p>a. <a href="http://cdm.unfccc.int/index.html">http://cdm.unfccc.int/index.html</a></p> <p>b. <a href="http://www.itouchmap.com">www.itouchmap.com</a></p> <p>c. <a href="http://envfor.nic.in/">http://envfor.nic.in/</a></p>
/B10/	Verification Protocol
/B11/	Guideline on the application of materiality in verifications , Version: 01.0 (EB 69, Annex 06)
/B12/	<ul style="list-style-type: none"> <li>• IS 15111:2002 (Part 1 &amp; 2)</li> <li>• IS 418:2004</li> </ul>
/B13/	Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.1)
/B14/	Guidelines for sampling and surveys for CDM project activities and programme of activities (version 03.0)
/B15/	BIS Guidelines for Implementation of IS 15111:2002 (Part 1 & 2) – Self-Ballasted Lamps
/B16/	<p>Web links for respective State Electricity Regulatory Commissions –</p> <ul style="list-style-type: none"> <li>• <a href="http://www.aperc.gov.in/">http://www.aperc.gov.in/</a></li> <li>• <a href="http://pserc.nic.in">http://pserc.nic.in</a></li> <li>• <a href="http://www.cserc.gov.in/">http://www.cserc.gov.in/</a></li> </ul>
/B17/	Back up data of surveyed Households surveyed by verification team during on site visit.
/B18/	Instruction to fill the monitoring report form (Version 4.0)

/B19/	SSC WG clarification number SSC-354 on AMS-II.J. (Version 03)
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**Key difference between webhosted MR and final MR (indicative not exhaustive)**

MR Section	Description of the change
MR Template	Version 3.2 to Version 04
Title page	Delinked MR excluding CPA implemented by HPL in line with para 239 of CDM project standard, Version 05 and subsequent amendment as proposed in para 50(a) of EB 81 meeting report
MR section A.1	No of CPAs due to delinking of MR, ER value due to delinking
MR section A.5	CPA specific Monitoring Period in Annexure 2
MR section B.1	<ul style="list-style-type: none"> <li>MR delinking, CFL specification added,</li> </ul>
MR section D.1	Description, Source and value applied for parameters
MR section E.5	ER value (Estimated and Actual changed)
MR section E.6	Remarks on difference in ER values has been added in MR as Annexure 9
MR section E.7	ER value due to delinking and associated calculation errors

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## 7. FINDINGS DOCUMENT

Summary of findings	CAR	CL	FAR
	03	02	0

Date	Type & Number	Raised by	Reference
24/09/2014	CAR-01	Assessment Team	Verification Protocol
Non conformities raised			
The MR template used by the PP for reporting project related information and emission reduction is not the latest version available in CDM UNFCCC website.			
Project Participant's response		Date: 01/11/2014	
The latest template of MR available on UNFCCC website i.e. version 04 is now used for reporting project related information and emission reduction.			
Documentation Provided as Evidence by Project Participant			
Revised MR using MR template version 04.0.			
Information Verified by Team Leader		Date of review: 01/11/2014	
Revised MR using MR template version 04.0.			
Reasoning for not acceptance or close out			
PP has submitted the revised MR in the updated version of the template. Thus, CAR 01 was closed.			
Date of acceptance or non- acceptance		Date: 01/11/2014	Status: Closed

Date	Type & Number	Raised by	Reference
24/09/2014	CL-02	Assessment Team	Verification Protocol
Non conformities raised			
a. The ER sheet corresponding to the values given in MR is yet to be submitted by PP.			
b. PP is requested to submit all the documents pertaining to the recently implemented CPAs in the current monitoring period – 3223-0046, 3223-0047 and 3223-0049			
Project Participant's response		Date: 01/11/2014	
a. The CER calculation sheet corresponding to the values given in MR is now submitted to DOE.			
b. All the documents pertaining to the three newly included CPAs in current monitoring period have now submitted to DOE.			
Documentation Provided as Evidence by Project Participant			
1. Revised MR & CERs calculation sheet			
2. ICL Destruction certificates and monitoring survey reports of 3223-0046, 3223-0047 and 3223-0049			
Information Verified by Team Leader		Date of review: 01/11/2014	
• Revised MR & CERs calculation sheet			
• ICLs Destruction certificates and monitoring survey reports of 3223-0046, 3223-0047 and 3223-0049			
Reasoning for not acceptance or close out			
PP has provided the revised MR and corresponding CER calculation sheet which is in line with the applied methodology. In addition to this PP also submitted the documents related to the newly implemented CPAs i.e. 3223-0046, 3223-0047 and 3223-0049. The assessment team reviewed the survey details of the new CPAs along with the ICL destruction certificates and found appropriate. Thus CL 02 was closed.			
Date of acceptance or non-acceptance		Date: 01/11/2014	Status: Closed.

Date	Type & Number	Raised by	Reference
24/09/2014	CAR-03	Assessment Team	Verification Protocol
<b>Non conformities raised</b>			

a. The “Value applied” for the newly included CPAs in the current monitoring period – 3223-0046, 3223-0047 and 3223-0049 is not included for the parameters “EF <sub>CO2,ELEC,y</sub> ”, “L <sub>i</sub> ” and “High PF CFL life test report and test curves” in section D of MR.		
b. The “Value applied” for technical grid losses for year 2013-14 is not included in section D.2 of MR.		
c. It is not clear whether the values of parameter “P <sub>i, BL</sub> ” in section D.2 of MR are measured or calculated.		
d. The figures for CPA-3223-0029 and 3223-0037 in Annexure 2 and Annexure 3 of MR are inconsistent with the corresponding monitoring survey reports.		
e. The figures for CPA-3223-0037 in Annexure 6 of MR are inconsistent with the monitoring survey report.		
<b>Project Participant’s response</b>		<b>Date:</b> 01/11/2014
a. The “Value applied” for the newly included CPAs in the current monitoring period – 3223-0046, 3223-0047 and 3223-0049 is now included for the parameters “EF <sub>CO2,ELEC,y</sub> ”, “L <sub>i</sub> ” and “High PF CFL life test report and test curves” in section D of the revised MR.		
b. The “Value applied” for technical grid losses for year 2013-14 is now included in section D.2 of the revised MR.		
c. Values of parameter “P <sub>i, BL</sub> ” are calculated and now clearly mentioned in section D.2 of the revised MR		
d. The figures for CPA-3223-0029 and 3223-0037 in Annexure 2 and Annexure 3 of MR are consistent with the corresponding monitoring survey reports. Corresponding monitoring survey reports have now submitted to DOE for reference.		
e. The figures for CPA-3223-0037 in Annexure 6 of MR are consistent with the monitoring survey report. Corresponding monitoring survey report has now submitted to DOE for reference		
<b>Documentation Provided as Evidence by Project Participant</b>		
1. Revised MR and revised ER calculation sheet		
2. 1 <sup>st</sup> ex post monitoring survey reports of CPA-3223-0029 and 3223-0037		
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 01/11/2014
1. Revised MR and revised ER calculation sheet		
2. 1 <sup>st</sup> ex post monitoring survey reports of CPA-3223-0029 and 3223-0037		
<b>Reasoning for <del>not-acceptance</del> or close out</b>		
a. The “Value applied” for the CPAs which were added in the current monitoring period – 3223-0046, 3223-0047 and 3223-0049 for the following parameters “EF <sub>CO2,ELEC,y</sub> ”, “L <sub>i</sub> ” and “High PF CFL life test report and test curves” in section D of the revised MR has been checked and found correct.		
b. The technical grid losses for year 2013-14 is now included in section D.2 of the revised MR and found correct.		
c. Values of parameter “P <sub>i, BL</sub> ” is now mentioned in section D.2 of the revised MR, hence accepted.		
d. The figures for CPA-3223-0029 and 3223-0037 in Annexure 2 and Annexure 3 of MR are consistent with the corresponding monitoring survey reports.		
e. The figures for CPA-3223-0037 in Annexure 6 of MR are now made consistent with the monitoring survey report.		
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 1/11/2014
		<b>Status:</b> Closed

Date	Type & Number	Raised by	Reference
10/12/2014	CAR-04	Technical Reviewer	New finding generated from TR comment
<b>Non conformities raised</b>			
The project standard guidance referred on the cover page and section B.1 and MR is not the latest available EB 81 guidance on UNFCCC CDM website.			
<b>Project Participant's response</b>		<b>Date:</b> 10/12/2014	
Guidelines of the para 239 of CDM project standard, Version 05 and subsequent amendment as proposed in para 50(a) of EB 81 meeting report have now been updated on cover page and in section B.1 of the revised MR.			
<b>Documentation Provided as Evidence by Project Participant</b>			
Revised MR version 02.1			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 11/12/2014	
Revised MR version 02.1			
<b>Reasoning for <del>not-acceptance</del> or close out</b>			
The revised MR has been checked and the inclusion of reference to CDM project standard version 05 and latest available EB 81 meeting report has been confirmed. Hence, this finding is closed.			
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 11/12/2014	<b>Status:</b> Closed

Date	Type & Number	Raised by	Reference
10/12/2014	CL-05	Technical Reviewer	New finding generated from TR comment
<b>Non conformities raised</b>			
a. The CPA specific crediting period start dates are not included in Annexure 2 of MR as referred in section A.5 of the monitoring report.			
b. The MR does specify the reasons for delay in implementation of CPA nos. 3223-0030, 3223-0033, 3223-0040 and 3223-0042 as per para 194 (b) of PS, version 5 and para 226b of VVS version 5.			
<b>Project Participant's response</b>		<b>Date:</b> 10/12/2014	
a. The CPA specific crediting period start dates are now included in Annexure 2 of revised MR.			
b. The pending four CPA could not be implemented further because due to weakening of the carbon markets lead to drying up of investments and thereby resulting in the inability of CQC to take up further pending four CPAs. Same is mentioned in the revised MR.			
<b>Documentation Provided as Evidence by Project Participant</b>			
Revised MR version 02.1			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 11/12/2014	
Revised MR version 02.1			
<b>Reasoning for not acceptance or close out</b>			
a. The assessment team has checked and confirmed the inclusion of crediting period start dates in the Annexure 2 of revised MR. Hence, the finding is closed.			
b. The revised MR indicates the reasons for non-implementation of the four CPAs 3223-0030, 3223-0033, 3223-0040 and 3223-0042 as per para 194 (b) of PS, version 5 and para 226b of VVS version 5. Hence, the finding is closed.			
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 11/12/2014	<b>Status:</b> Closed

## 8. CERTIFICATE OF COMPETENCE

<b>Personnel Name:</b>		<b>Kaushik Pal</b>	
<b>Qualified to work as:</b>			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>		<b>Technical Area</b>	
Energy Industries (renewable/non-renewable)		TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
Energy Demand		TA 3.1 Energy Demand	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		04/04/2013	

<b>Personnel Name:</b>		<b>Akhilesh Joshi</b>	
<b>Qualified to work as:</b>			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>		<b>Technical Area</b>	
Energy industries (renewable/non-renewable sources)		TA 1.2: Energy generation from renewable energy sources	
Energy Demand		TA 3.1: Energy Demand	
Approved by (Manager C & T)		Gagandeep Kakkar	
Approval date:		28/04/2014	

<b>Personnel Name:</b>		<b>Sayali Kumar</b>	
<b>Qualified to work as:</b>			
Team Leader	<input type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>		<b>Technical Area</b>	
Energy industries (renewable/non-renewable sources)		TA 1.2: Energy generation from renewable energy sources	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		25/06/2012	

<b>Personnel Name:</b>		<b>Sanjay Kandari</b>	
<b>Qualified to work as:</b>			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>



Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>	<b>Technical Area</b>		
Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources		
Approved by (Manager C & T)	Mayank Kumar Jain		
Approval date:	09/08/2012		

Personnel Name:		Gagandeep Kakkar	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope		Technical Area	
Energy Industries (renewable/non-renewable sources)		TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
Energy demand		TA 3.1. Energy Demand	
Chemical industry		TA 5.1. Chemical Industry	
Waste Handling and Disposal		TA 13.1 Waste Handling and Disposal	
Approved by (Manager C & T)		Sanjay Kandari	
Approval date:		04/03/2014	

### Annexure -1

#### Sample survey form used by DoE during verification

**DOE Field Survey Form PoA- 3223 (2<sup>nd</sup> MP verification)**

SSC-CPA Unique Identification No:- 039-CD-C-PB (UN Ref No.) 3223-0039

KBS Reference Number: CDM.14.VER.004

Name of DISCOM: PS PCL

CIRCLE, DIVISION: Tarn Taran and Kapurthala ; Sub Tarn Taran, Pathi, Bhikhoind cit  
Kapurthala, Suburban Kapurthala

Name(s) of the verification team members who collected the following information: Sayali A. Kumar	Place: Punjab (Fatehabad, Dhonda)  Date: 01/08/2014
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Name of the household consumer of the utility	Kulwinder Singh
Address of the surveyed household	Dhunda
Household unique utility consumer number	761DN4308674
Name of the dweller/ interviewee	Kulwinder Kaur (Daughter)
Age of the interviewee	18
Status of the dweller (Owner/Tenant/Other)	Owner


Sr. No.	Information Required	Feedback					
1	Whether the same household was surveyed in ex-post monitoring survey by CPA implementer	✓ YES/ NO					
2	Number of CFL installed	1	2	3	4	>4	
	Wattages(W) of CFL installed	11	18	18	18		
3	The project CFLs are having BLY logo & CPA implementer logo	✓ YES/ NO					
4	Type of distribution	Direct		Indirect			
	It had been told to install in high usage area of the house	✓ YES/ NO					
5	Project CFL(s) flickers	YES/ NO ✓					
6	Project CFL(s) found installed and working during this site visit(11W/14W/18W/20W)	Number	1	2	3		
	Wattage (W)	11	18	18			
7	Reason of failure	NA	Defective	Poor performance	In reserve	Sold/ given away	Others
	Defective CFL(s) was replaced by the household		YES / NO ✓				

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DOE Field Survey Form PoA- 3223 (2<sup>nd</sup> MP verification)

	Replacement lamp type installed by household in place of fused CFL(s)	✓ NA	ICL	TFL	CFL	LED	OTHERS
	Replacement Lamp Wattage (W)						
	(If the replaced lamp was CFL) The replaced lamp was installed at the time of survey by CPA implementer		YES/NO				
	(If the replaced lamp was not CFL) Mention the reason of not using CFL						
8	What is the disposal mechanism of fused CFL lamps?	NA					
9	Additional information (if any)	NA					

Signature of the dweller/ interviewee:  Rajwinder Kaur	Signature of the auditor:  
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#### History of the document

Version	Date	Nature of revision	Reviewed by	Approved by
4.0	14/12/2013	Guidance included/improved	Manager CDM Quality 23/12/2013	Managing Director 23/12/2013
3.1	29/10/2012	Updated for EB69 Annex6	Manager CDM Quality 29/10/2012	Managing Director 29/10/2012
3.0	31/08/2012	Revised for VVS Track	Manager CDM Quality 08/09/2012	Managing Director 10/09/2012
2.0	21/12/2011	Comprehensively revised	Manager CDM Quality 21/12/2011	Managing Director 21/12/2011