

# VERIFICATION & CERTIFICATION REPORT

BUREAU OF ENERGY EFFICIENCY

## CFL LIGHTING SCHEME – “BACHAT LAMP YOJANA”

(UNFCCC PoA Ref. No. 3223)

Monitoring Period

(30/05/2010 to 31/12/2012, including both dates)

REPORT No.

CDM.13.VER.004.MP01

(FOR CPA NO. 3223-0002 TO 3223-0021; BATCH 2)

<i>Date of this issue:</i> 20/09/2014		<i>KBS Ref. No.:</i> CDM.13.VER.004.MP01	
<i>PoA Title:</i>		CFL lighting scheme – “Bachat Lamp Yojana”	
<i>Organization:</i>		KBS Certification Services Pvt. Ltd.	
<i>Client:</i>		Bureau of Energy Efficiency	
<i>Monitoring Period:</i>		30/05/2010 to 31/12/2012 (including both dates)	
<i>Summary:</i>			
<p>KBS Certification Services Pvt. Ltd. has performed the first verification of the CDM PoA “CFL lighting scheme – “Bachat Lamp Yojana” and UNFCCC PoA Ref. Number 3223. The BLY PoA includes three CPA implementers EMC, CQC and HPL. However, this verification report is based on the Monitoring Report (MR) Batch 2 which covers only 20 CPAs of EMC included under the PoA as on 31/12/2012. The request from CME (BEE) for the delinked Monitoring Report (MR) Batch 2 of EMC from CQC and HPL for 1<sup>st</sup> verification of BLY-PoA has been considered in accordance with the guidelines of 75<sup>th</sup> meeting of CDM-EB. The verification confirms 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 batch 1 verification report of MP 1;</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 867,045 tCO<sub>2</sub>e emission reductions during period 30/05/2010 to 31/12/2012.</p>			
<i>Subject Group:</i> CDM Verification (VVS V6)		<i>Sectoral Scope(s):</i> 3	
		<i>Methodology:</i> AMS-II.J. (Version 3.0)	
<b>Verification Team:</b>		<b>Monitoring report:</b>	
<i>Team Leader</i>	Kaushik Pal	First version	17/09/2013
<i>Verifier</i>	Akhilesh Joshi Sayali Kumar Sameer Zope (till 30/01/2014) Megha Lotankar (Trainee)	Final version	19/09/2014
<i>Local Expert</i>	Akhilesh Joshi B. Rampradap Megha Lotankar		
<i>Technical Expert (03.1)</i>	Kaushik Pal Akhilesh Joshi B. Rampradap		
<b>Independent Technical Reviewer Team:</b>		<b>Verification status:</b>	
<i>Date</i>	17/09/2014	<input type="checkbox"/> Findings not closed.	
<i>Technical Reviewer</i>	Sanjay Kandari	<input type="checkbox"/> Draft verification opinion	
<i>Technical Expert (03.1)</i>	Gagandeep Kakkar	<input checked="" type="checkbox"/> Final verification opinion	
<b>Manager T&amp;C</b>	Gagandeep Kakkar		
<b>Date</b>	20/09/2014		

<b>Authorized Signatory:</b>		<b>Indexing Terms</b>
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## Abbreviations

AMS	Approved Methodology Small Scale
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
EMC	Energy Management Centre, Kerala
ERs	Emission Reductions
FAR	Forward Action Request
GHGs	Greenhouse Gas(es)
GEF	Grid Emission Factor
H,M,L	High, Medium, Low
HPL	HPL Electric & Power Pvt. Ltd.
ICL	Incandescent Lamp
IS	Indian Standard
ISO	International Organization of Standardization
IPCC	Intergovernmental Panel on Climate Change
KBS	KBS Certification Services Pvt. Ltd.
KP	Kyoto Protocol
KSEB	Kerala State Electricity Board
KSIDC	Kerala Small Industries Development Corporation
kWh	Kilo Watt Hour
LFR	Lamp Failure Rate
MR	Monitoring Report
MP	Monitoring Plan
MWh	Mega Watt Hour
PoA-DD	Programme of Activities- Design Document
PF	Power Factor
PoA	Programme of Activities
PS	CDM Project Standard
PCP	CDM Project Cycle Procedure
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM Validation & Verification Standard

## 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. 3223-0002 to 3223-0021, for the reported GHG emission reductions for the given monitoring period 30/05/2010 to 31/12/2012 (both dates included). The BLY PoA includes three CPA implementers EMC, CQC and HPL. Based on the request from CME (BEE) for the delinking of Monitoring Report (MR (Batch 2)) of EMC Kerala from CQC and HPL for 1<sup>st</sup> verification of BLY-PoA under the guidelines of 75<sup>th</sup> meeting of CDM-EB has been considered 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>Other Party:</i>	<i>Netherlands</i>
<i>Title of project activity:</i>	<i>CFL lighting scheme – "Bachat Lamp Yojana"</i>
<i>UNFCCC Registration No:</i>	<i>UNFCCC registration No. 3223</i>
<i>PoA Registration date:</i>	<i>29/04/2010</i>
<i>Applied methodology:</i>	<i>AMS-II.J, version 03</i>
<i>CPA-wise start date of crediting period:</i>	<i>Refer Table 1 below</i>

<i>Project Participants:</i>	<i>Bureau of Energy Efficiency C- Quest Capital Malaysia Limited</i>
<i>Location of the project activity:</i>	<i>The project activity CPAs covered under this monitoring report spreads across Kerala State in India (Host Country). The CPA project area covers twenty (20) districts of Kerala state.</i>

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

<b>CPA UNFCCC Ref. No.</b>	<b>Crediting period Start date (in DD/MM/YYYY)</b>
3223-0002	01/05/2011
3223-0003	09/05/2011
3223-0004	09/05/2011
3223-0005	09/05/2011
3223-0006	09/05/2011
3223-0007	09/05/2011
3223-0008	09/05/2011
3223-0009	09/05/2011
3223-0010	09/05/2011
3223-0011	09/05/2011
3223-0012	09/05/2011
3223-0013	09/05/2011
3223-0014	09/05/2011
3223-0015	09/05/2011
3223-0016	09/05/2011
3223-0017	09/05/2011
3223-0018	09/05/2011
3223-0019	09/05/2011
3223-0020	09/05/2011
3223-0021	09/05/2011

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 CFLs<sup>P04c/</sup> in the 20 implemented CPAs and the detailed implementation status of 20 CPAs has been discussed in section 3.2 of this report. All the 20 CPAs are active and located in the twenty (20) districts across Kerala state of India (host country).

The latitude and longitude information on the major cities and towns within the project boundary, where CFLs were distributed (i.e. 20 implemented CPAs) is mentioned in the Table 2 below:

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

UNFCCC Ref. No.	State	District	Division	Latitude	Longitude
				Decimal Degree +	Decimal Degree +
3223-0002	Kerala	Thiruvananthapuram	Thiruvananthapuram, Kazhakuttam, Attingal	8.5033	76.9516
3223-0003	Kerala	Thiruvananthapuram	Neyyatinkara, Nedumangad	8.5033	76.9516
3223-0004	Kerala	Pathanmihitta	Pathanmihitta, Adoor, Thiruvalla	9.24	76.815
3223-0005	Kerala	Kottayam	Pallom, Changanssery, Vaikom	9.5866	76.5216
3223-0006	Kerala	Kottarakkara	Kundra, Kottarakara, Punalur	8.9966	76.775
3223-0007	Kerala	Kollam	Chathanoor, Kollam, Karunagapally	8.88	76.5883
3223-0008	Kerala	Palakkad	Palakkad, Chittur, Alathur	10.766	76.466
3223-0009	Kerala	Palakkad	Shornur, Mannarakad	10.766	76.2833
3223-0010	Kerala	Malappuram	Tirur, Thirurangadi, Ponnani	10.15	76.5166
3223-0011	Kerala	Malappuram	Manjeri, Perinthalmanna, Nilambur	11.1166	76.1166
3223-0012	Kerala	Kannur, Wayanad	Kannur, Thalassery, Mananthavady, Kalpetta	Kannur- 11.8666 Kalpetta- 11.1	Kannur- 75.4166 Kalpetta- 76.0166
3223-0013	Kerala	Kozikhode	Kozikhode, Feroke, Balussery	11.25	75.8166
3223-0014	Kerala	Kozikhode	Vadakara, Nadapuram	11.6092	75.5797
3223-0015	Kerala	Kasargod, Kannur	Kasargod, Kanhagad, Payyannur, Iritty	Kasargod - 12.5 Sreekandapu ram - 11.8666	Kasargod- 75.00 Sreekanda puram- 75.4166
3223-0016	Kerala	Thrissur	Thrissur(east), Thrissur(west), Kunnamkulam, Wadakkanchery	10.5166	76.2016
3223-0017	Kerala	Ernakulam	Ernakulam, Mattancherry, Thripunithura	10.015	76.3033
3223-0018	Kerala	Thrissur	Irinjalakkuda, Chalakkudy, Kodungalloor	10.333	76.215
3223-0019	Kerala	Kottayam, Idukki	Pala, Ponnukunnam, Thodupuzha, Kattappana, Peerumade, Adimalay	Pala - 9.71 Thodupuzha - 9.8933	Pala - 76.68 Thodupuzh a - 76.68
3223-0020	Kerala	Ernakulam	Moovattupuzha,	10.10	76.4733



			Aluva, Perumbavoor, North Parur		
3223-0021	Kerala	Allappuzha	Allappuzha, Mavelikkara, Chengannoor, Cherthala	9.41	76.41

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 located in the Kerala state 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. Only 14W CFLs are distributed under the project activity and it replaced ICL equivalent lumens as derived from the Indian standard IS 418:2004<sup>/B12/</sup> for ICLs. The 14W CFLs (760 lumen output) is replacing 60W ICLs having 620 lumen output. 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 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 confirmed during on site visit that none of the visited household has received more than even 2 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 and it's corresponding Address, Name, Electricity Board sub-division name, Name of Electricity Circle, Number of CFLs given (14 W), Number of working ICLs collected (60 W) and Date of installation of CFLs.

## 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 6.0 of CDM VVS, to capture the assessment of applicable CDM requirements viz., version 6.0 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***

Verification Contract	06/05/2013
Publication of MR	20/09/2013
On site verification	17/10/2013 to 13/11/2013
Draft Verification Report	28/05/2014
Final Verification Report	20/09/2014

### 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 and Technical Expert), B.Rampradap (Technical Expert, Local Expert) and Sameer Zope (Verifier) and details are mentioned below;

<b>Location</b>	Kerala State : India	
<b>Dates</b>	17/10/2013 to 13/11/2013	
<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	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
	Johnson Daniel	Energy Technologist, EMC
	Balachandar.V	Chief Engineer, Corporate Planning, KSEB
	Mini George	Deputy C.E(Planning II) Corporate Planning, KSEB
Information flows for generating, aggregating and reporting the monitoring parameters	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
	Johnson Daniel	Energy Technologist, EMC
Competency of the operating personnel and monitoring personnel	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
	Johnson Daniel	Energy Technologist, EMC
Ex Post Sampling Survey and data collection procedures	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
	Johnson Daniel	Energy Technologist, EMC
Quality Control and Quality Assurance procedures against the registered monitoring plan	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
Calculation and assumptions made in determining the GHG data and emission reductions	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
Compliance with CDM criterion and relevant guidance with respect to registered monitoring plan	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
	Sandeep .K	Energy Technologist, EMC
Level of accuracy of the monitoring activity	K. M. Dhahesan Unnithan	Director, EMC
	Suwil Kumar W.S	System Manager, EMC
Installation and operation of the distributed CFLs (through random sampling approach)	400 households in the Kerala State (20 households in each CPA area)	

## 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 first monitoring period of the PoA for batch 2. All raised CARs and CLs were successfully closed during the validation of the CDM PoA and Validation of the included CPAs. Assessment team has confirmed from the validation report<sup>B05/</sup> available at project web page<sup>B08/</sup> that there is no issue pending from validation.

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

##### Discussion:

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

The report applies to the first 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
021-EMC-KL	3223-0002	CFL lighting scheme – “Bachat Lamp Yojana” in Thiruvananthapuram Urban Circle of Kerala State Electricity Board, Kerala, India
020-EMC-KL	3223-0003	CFL lighting scheme – “Bachat Lamp Yojana” in Thiruvananthapuram Rural Circle of Kerala State Electricity Board, Kerala, India
019-EMC-KL	3223-0004	CFL lighting scheme – “Bachat Lamp Yojana” in Pathanamthitta Circle of Kerala State Electricity Board, Kerala, India
018-EMC-KL	3223-0005	CFL lighting scheme – “Bachat Lamp Yojana” in Kottayam Circle of Kerala State Electricity Board, Kerala, India
017-EMC-KL	3223-0006	CFL lighting scheme – “Bachat Lamp Yojana” in Kottarakkara Circle of Kerala State Electricity Board, Kerala, India
016-EMC-KL	3223-0007	CFL lighting scheme – “Bachat Lamp Yojana” in Kollam Circle of Kerala State Electricity Board, Kerala, India
012-EMC-KL	3223-0008	CFL lighting scheme – “Bachat Lamp Yojana” in Palakkad Circle of Kerala State Electricity Board, Kerala, India
013-EMC-KL	3223-0009	CFL lighting scheme – “Bachat Lamp Yojana” in Shornur Circle of Kerala State Electricity Board, Kerala, India
014-EMC-KL	3223-0010	CFL lighting scheme – “Bachat Lamp Yojana” in Tirur Circle of Kerala State Electricity Board, Kerala, India
011-EMC-KL	3223-0011	CFL lighting scheme – “Bachat Lamp Yojana” in Manjeri Circle of Kerala State Electricity Board, Kerala, India
008-EMC-KL	3223-0012	CFL lighting scheme – “Bachat Lamp Yojana” in Kannur and Kalpetta Circles of Kerala State Electricity Board, Kerala, India
010-EMC-KL	3223-0013	CFL lighting scheme – “Bachat Lamp Yojana” in Kozhikode Circle of Kerala State Electricity Board, Kerala, India
015-EMC-KL	3223-0014	CFL lighting scheme – “Bachat Lamp Yojana” in Vadakara Circle of Kerala State Electricity Board, Kerala, India
009-EMC-KL	3223-0015	CFL lighting scheme – “Bachat Lamp Yojana” in Kasargod and

		Sreekandpuram Circles of Kerala State Electricity Board, Kerala, India
007-EMC-KL	3223-0016	CFL lighting scheme – “Bachat Lamp Yojana” in Thrissur Circle of Kerala State Electricity Board, Kerala, India
003-EMC-KL	3223-0017	CFL lighting scheme – “Bachat Lamp Yojana” in Ernakulam Circle of Kerala State Electricity Board, Kerala, India
004-EMC-KL	3223-0018	CFL lighting scheme – “Bachat Lamp Yojana” in Irinjalakkuda Circle of Kerala State Electricity Board, Kerala, India
005-EMC-KL	3223-0019	CFL lighting scheme – “Bachat Lamp Yojana” in Pala & Thodupuzha Circles of Kerala State Electricity Board, Kerala, India
006-EMC-KL	3223-0020	CFL lighting scheme – “Bachat Lamp Yojana” in Perumbavoor Circle of Kerala State Electricity Board, Kerala, India
002-EMC-KL	3223-0021	CFL lighting scheme – “Bachat Lamp Yojana” in Allappuzha Circle of Kerala State Electricity Board, Kerala, India

The PoA involves the distribution of 2 number of CFLs (14W) in exchange of 2 number of ICL bulbs (60W) and INR: 15.00 for each participating household use. The total number of CFL distributed under the above mentioned CPAs (20 implemented CPAs) are 12,614,020<sup>P04c/</sup>. The details of implementation of the 20 implemented CPAs are provided below –

**Table 4: Implementation Status of Individual CPAs (20 implemented CPAs)**

UNFCCC Reference No.	Start date of CFL distribution / installation	End date of CFL distribution / installation	Start Date of ICL destruction	End Date of ICL destruction	Start Date of 1 <sup>st</sup> ex post Monitoring survey	End Date of 1 <sup>st</sup> ex post Monitoring Survey
3223-0002	16/03/2010	30/06/2010	16/04/2014	26/04/2014	01/07/2011	31/07/2011
3223-0003	16/03/2010	30/06/2010	10/03/2014	20/03/2014	01/07/2011	31/07/2011
3223-0004	20/03/2010	15/07/2010	30/04/2014	08/05/2014	26/09/2011	26/10/2011
3223-0005	16/03/2010	15/07/2010	04/04/2014	12/05/2014	10/07/2011	09/08/2011
3223-0006	16/03/2010	30/06/2010	26/04/2014	05/05/2014	02/01/2012	01/02/2012
3223-0007	20/03/2010	30/06/2010	21/04/2014	30/04/2014	02/11/2011	02/12/2011
3223-0008	26/05/2010	15/09/2010	23/05/2014	29/05/2014	09/07/2011	08/08/2011
3223-0009	27/05/2010	15/09/2010	21/05/2014	31/05/2014	09/07/2011	08/08/2011
3223-0010	04/06/2010	15/09/2010	26/05/2014	03/06/2014	05/09/2011	05/10/2011
3223-0011	07/06/2010	15/09/2010	28/05/2014	05/06/2014	16/12/2011	15/01/2012
3223-0012	05/06/2010	15/09/2010	02/06/2014	12/06/2014	21/11/2011	21/12/2011
3223-0013	12/06/2010	15/09/2010	02/06/2014	10/06/2014	05/09/2011	05/10/2011
3223-0014	16/06/2010	15/09/2010	02/06/2014	13/06/2014	05/09/2011	05/10/2011
3223-0015	21/06/2010	15/09/2010	11/06/2014	20/06/2014	21/11/2011	21/12/2011
3223-0016	06/05/2010	31/07/2010	24/05/2014	26/05/2014	28/06/2011	28/07/2011
3223-0017	28/04/2010	31/07/2010	09/05/2014	19/05/2014	18/11/2011	18/12/2011
3223-0018	10/05/2010	31/07/2010	14/05/2014	23/05/2014	28/10/2011	27/11/2011
3223-0019	26/03/2010	31/07/2010	09/05/2014	17/05/2014	10/07/2011	09/08/2011
3223-0020	05/05/2010	31/07/2010	12/05/2014	20/05/2014	18/11/2011	18/12/2011
3223-0021	25/03/2010	31/07/2010	03/04/2014	14/05/2014	01/09/2011	01/10/2011

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>, the letter sent by EMC to CME (BEE)<sup>P20a/</sup> and the letter sent by KSEB to EMC<sup>P20b/</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 installed by the PP as per the registered CPA-DDs of 20 implemented CPAs is 12,614,020<sup>B04/</sup>. Verification team checked the technical specification of the project lamps



from the purchase agreement<sup>/P06/</sup> as provided by the CFL manufacturer (i.e. Philips Electronics (I) Limited) and found that same is in line with the PoA DD<sup>/B04/</sup> as well as MR<sup>/P02c/</sup>. However, based on the participation of the consumers, PP had distributed a total number of 12,614,020 CFLs<sup>/P04c/</sup>. The distribution of the CFLs is recorded in accordance with the monitoring information provided in the registered PoA DD and CPA DDs<sup>/B04/</sup>. During on site visit the following deviation has been observed by the assessment team:

- The Qpj survey was not completed on the time line mentioned in the registered CPA DD and Para 14 (i) of the methodology AMS.II.J version 03 most of the CPAs. ..

The above mentioned deviation is falling under the category of 'temporary deviations from the registered monitoring plan or applied methodology'- para 3 of appendix of PS version 6.

The details of the temporary deviation are also given in section 3.4 of this report. In this context CAR 04 was raised by the assessment team, Further, the assessment team has converted the CAR 04 to FAR 10 as the clarification from PP has explained that the deviation in timeline of the Qpj survey as per the Para 14 (i) of the methodology AMS.II.J version 03 was mainly due to the delayed investment approval from Power Department of Kerala (Government of India) for one year. The assessment team confirmed that the PP has temporarily not monitored Qpj (the number of CFLs of the group 'i' CFLs(ex;14W CFL) in operation during first 12 month of distribution) which was the key parameter used to determine the Lamp Failure Rate (LFR<sub>i,y</sub>). Therefore, as per Para 3 of Appendix 1 of PS version 6 the conversion of CAR to FAR is appropriate. The details of the conversion of CAR to FAR is given in the section 7 of this verification report.

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 Kerala State 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>/P02c/</sup>. The dates are in line with the electronic database<sup>/P13/</sup> the letter sent by EMC to CME (BEE)<sup>/P20a/</sup> and the letter sent by KSEB to EMC<sup>/P20b/</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 letter sent by CPA implementer to the BEE (CME)<sup>/P20a/</sup>, the letter sent by KSEB to EMC<sup>/P20b/</sup> and the ER spreadsheet<sup>/P04c/</sup> to assess total number of 12,614,020 CFLs<sup>/P04c/</sup> and concludes that 12,614,020 CFLs have been distributed and installed in the households.

### CFL Distribution and Installation:

The less energy efficient working ICLs are exchanged with energy efficient CFLs at the cost of INR 15 per CFL, CPA Implementer has distributed the CFL and collected the working ICL at the collection points informed to the consumers. At the time of distribution of CFLs, the CPA implementer has issued a public notice to the consumers of the individual households located in the Kerala State of India for the installation of the high power factor CFLs. In addition awareness programs for the distribution and installation of the CFLs were carried out by the CPA implementers 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 Number provided by the state electricity boards).

As per the Project Implementation Manual developed by CPA Implementers<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 assessment team –

- Interviewing benefited households under the CPA
- By verifying the public notice for the CFL distribution and installation issued by PP to the consumers located in each CPA<sup>/P19/</sup>
- By interviewing the distributor (KSEB) involved in the CFL distribution process

Each CFL was distributed at a price of INR 15, which was also demonstrated via on-site interviews conducted by the verification team. By checking the receipt issued by the CPA implementer to individual consumer<sup>/P25/</sup> during on site visit and on-site observation, verification team has found that only 2 Nos. of 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 one (1) unique identification logos of CPA Implementers name, "KSEB-EMC-BLY"<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 04.1) /B13/ and §17 of methodology AMS-II.J. (Version03)<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 10.65% based on 10,000 hours of rated operating life of CFLs)

Thus, the sample size, n –

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

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



Hence,  $n = 270.6025 * (1 - 0.1065) / 0.1065 = 2,270.26 = 2,500$  CFLs (as a conservative approach the sample is roundup to 10%)

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-5 of the MR<sup>/P02c/</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 04.1).

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 04.1)<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 04.1)<sup>/B13/</sup> and based on verification team’s professional judgment, the verification team has chosen a random sample size of 400 households (which is having 800 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 04.1)).
- The sample size considered appropriate as the Table 1 of Standard for “Sampling and surveys for CDM project activities and programmes of activities” (version 04.1)<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 04.1) 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 400 households located in the implemented CPAs of 20 districts. 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 04.1), verification team has visited a total of 400 households during the site visit and has found PP’s 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 04.1)<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/</sup>
3223-0002	40	40
3223-0003	40	40
3223-0004	40	40
3223-0005	40	40
3223-0006	40	40
3223-0007	40	40
3223-0008	40	40
3223-0009	40	40
3223-0010	40	40
3223-0011	40	40
3223-0012	40	40
3223-0013	40	40
3223-0014	40	40
3223-0015	40	40
3223-0016	40	40
3223-0017	40	40
3223-0018	40	40
3223-0019	40	40
3223-0020	40	40
3223-0021	40	40
<b>TOTAL</b>	<b>800</b>	<b>800</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/B17/	LFR observed during on site visit (%)	Remarks on observed LFR compared to ex ante LFR assumed during on site visit
	14W	14W	
3223-0002	16	40.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0003	15	37.50%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.

3223-0004	10	25.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0005	16	38.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0006	14	35.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0007	15	37.50%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0008	13	32.50%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0009	14	35.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0010	13	32.50%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0011	13	32.50%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0012	12	30.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0013	16	40.00%	The field survey conducted by the assesment team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for

			4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0014	12	30.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0015	12	30.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0016	15	37.50%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0017	16	40.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0018	14	35.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0019	16	40.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0020	15	37.50%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.
3223-0021	16	40.00%	The field survey conducted by the assesement team is in the fourth year after completion date of distribution of CFL. Therefore, the LFR observed is within the limit of the ex ante LFR assumed for 4th Year (i.e. 42.58%) from completion of CFL distribution.

Based on the LFR calculated from the survey results, the verification team confirms that the LFR rate of all the CPAs are within the ex-ante LFR mentioned in the CPA DD of all 20 CPAs.

#### ICL destruction:

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 issued by State Electricity Board and the taking over issued by the ICL Kerala Small Industries Development Corporation (destruction agency)<sup>/P12/</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 handed over to the destruction agency<sup>/P11/</sup> designated by EMC respectively for the destruction. On receiving the ICLs, the Kerala Small Industries Development Corporation has acknowledged the receipt of working ICLs and issued "taking over certificate for Destruction"<sup>/P12/</sup>. The collected ICLs have been completely destroyed by the ICL destruction agency<sup>/P26/</sup>. The CFLs distributed under BLY programme has also been provided with a one year guarantee by the EMC to the CFL recipients<sup>/P19/</sup>.

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 EMC, Principal project owner & implementer for the project and BEE (i.e. CME). The management teams of EMC has applied all the procedures, databases, infrastructure for smooth roll out of the CFLs distribution in exchange of right ICLs (i.e. distribution of 14W CFL for 60W ICL) and the destruction of ICLs surrendered by the users.

EMC have 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 12.17% lower than the estimated emission reductions stated in the registered CPA DDs<sup>/B04/</sup>. The LFR values considered for ER calculations are on the higher side compared to ex ante LFR assumed in registered CPA-DDs.

The comparison between projected and estimated emission reductions has been provided below:

Monitoring period	Total Actual values achieved for 20 implemented CPAs (tCO <sub>2</sub> e)	Total Emission reductions as per the registered CPA-DDs for 20 implemented CPAs (tCO <sub>2</sub> e)
30/05/2010 to 31/12/2012 (Both dates included)	867,045	987,224

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

UNFCCC Ref. No.	CPA specific Monitoring	Actual Emission Reduction (tCO <sub>2</sub> e)	Projected Emission Reduction as per CPA-DD (tCO <sub>2</sub> e)	Remarks on difference between
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	<b>period length in number of days</b>			<b>estimated and actual emission reductions</b>
3223-0002	611	46,106	54,814	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0003	603	45,886	53,550	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0004	603	38,255	38,765	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0005	603	29,151	38,698	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0006	603	37,476	40,938	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0007	603	39,073	46,071	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0008	603	46,108	47,608	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0009	603	31,993	35,084	The difference is because the survey resulted in a large discount factor than anticipated due to

				field conditions
3223-0010	603	41,444	43,760	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0011	603	51,992	56,143	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0012	603	61,935	62,464	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0013	603	42,247	50,015	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0014	603	36,809	37,849	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0015	603	62,915	64,371	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0016	603	42,313	52,611	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0017	603	28,896	35,328	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions



3223-0018	603	38,534	45,284	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0019	603	45,901	56,592	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0020	603	47,546	61,113	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions
3223-0021	603	52,465	66,166	The difference is because the survey resulted in a large discount factor than anticipated due to field conditions

#### Findings:

CAR-02, CAR-03 were raised and closed successfully. Please refer section 7 of this report.

#### Opinion:

The verification team confirms that in the current monitoring period -

- The twenty (20) number of CPAs covered under this verification report were implemented as of 31/12/2012 (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.
- There is a temporary deviation not requiring prior approval in the current monitoring period. The details of the deviation are stated in the section above as well as in section 3.4 of the report. The sample size selected 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 04.1)<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 participant has 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 V6<sup>/B06a/</sup> has been met.
- In accordance with §228 of VVS V6<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>/B05/</sup>, the applied monitoring methodology<sup>/B01/</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 (915 days) is 987,224 tCO<sub>2</sub>e while the actual emission reductions achieved during the monitoring period are 867,045 tCO<sub>2</sub>e. Thus, the assessment team confirms that the actual emission reductions achieved during the monitoring period is 12.17% lesser than the estimated emission reduction.



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

#### Discussion:

The monitoring plan of the project activity has temporarily deviated from the applied methodology for the current monitoring period<sup>/B01/</sup>. As per para 14(i) of the applied methodology AMS-II.J., version 03, the first ex post monitoring survey is required to be carried out within first year after installation of all efficient lighting equipment i.e. the CFL distribution end date. However, it was observed by the assessment team during the course of verification, that for the CPAs listed in the table in section 3.4 below, the date of Q<sub>pi</sub> report is not falling under the time line mentioned in the registered CPA-DD and applied methodology. Hence, a temporary deviation not requiring prior approval by EB has been requested in this monitoring period. The details of the post-registration change have been given in section 3.4 below. 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 approach for each parameter apart from the first ex-post monitoring survey (Q<sub>PJ</sub>) described in the Registered PoA-DD<sup>/B04/</sup> was found consistent in terms of unit, measurement procedures and monitoring frequency.

#### Findings:

CAR-04 was raised relevant to this section and converted to FAR-10.

#### Opinion:

In the opinion of the verification team, apart from the temporary deviation explained in section 3.4 of this report below, 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 V6<sup>/B06a/</sup>.

### 3.4 Post registration changes, if any

#### Discussion:

The post registration change described below was identified during the verification. The validation of post registration changes not requiring prior approval by the CDM EB is carried out in accordance with Appendix 1 to the CDM Project Standard. The type of the changes and the assessment (of post registration changes) as described below is submitted together as part of the request for issuance.

The post registration change is in the category "Temporary deviations from the registered monitoring plan or applied methodology" (Cp Appendix 1 of Project Standard), the details of which are given below:

Type	Temporary deviations				
Description	As per para 14(i) of the applied methodology AMS-II.J., version 03, the first ex post monitoring survey has to be carried out within first year after installation of all efficient lighting equipment i.e. the CFL distribution end date. However, it was observed by the assessment team during the course of verification, that for the CPAs listed in the table below, the date of Q <sub>pi</sub> report is not falling under the time line mentioned in the registered CPA-DD and applied methodology.				
	CPA UNFCCC Ref. No.	CFL distribution end date	Date of completion of one year	First Ex-post Monitoring Survey End	Extent of deviation in days

				date	
3223-0002	30/06/2010	29/06/2011	31/07/2011	32	
3223-0003	30/06/2010	29/06/2011	31/07/2011	32	
3223-0004	15/07/2010	14/07/2011	26/10/2011	104	
3223-0005	15/07/2010	14/07/2011	09/08/2011	26	
3223-0006	30/06/2010	29/06/2011	01/02/2012	217	
3223-0007	30/06/2010	29/06/2011	02/12/2011	156	
3223-0008	15/09/2010	14/09/2011	08/08/2011	-	
3223-0009	15/09/2010	14/09/2011	08/08/2011	-	
3223-0010	15/09/2010	14/09/2011	05/10/2011	21	
3223-0011	15/09/2010	14/09/2011	15/01/2012	123	
3223-0012	15/09/2010	14/09/2011	21/12/2011	98	
3223-0013	15/09/2010	14/09/2011	05/10/2011	21	
3223-0014	15/09/2010	14/09/2011	05/10/2011	21	
3223-0015	15/09/2010	14/09/2011	21/12/2011	98	
3223-0016	31/07/2010	30/07/2011	28/07/2011	-	
3223-0017	31/07/2010	30/07/2011	18/12/2011	141	
3223-0018	31/07/2010	30/07/2011	27/11/2011	120	
3223-0019	31/07/2010	30/07/2011	09/08/2011	10	
3223-0020	31/07/2010	30/07/2011	18/12/2011	141	
3223-0021	31/07/2010	30/07/2011	01/10/2011	63	
	<p><b>Post registration change:</b> From the above table it can be observed that the first ex post monitoring survey has not been conducted within 1 year, Thus, it has resulted in a temporary deviation from the registered CPA-DD and the para 14(i) of applied methodology during the current monitoring period. The reason for this delay in the first ex post monitoring survey is as follows – <i>EMC is involved as a CPA implementer and investor for CDM BLY PoA. However, the approval for the investment required in conducting the <math>Q_{pj}</math> survey has to be sanctioned by Power Department of Kerala. As the investment for the <math>Q_{pj}</math> survey involved in the project is huge, the approval got delayed due to lengthy internal approval process of Power Department of Kerala. Otherwise the <math>Q_{pj}</math> survey were actually planned to start before the project registration.</i></p>				
<b>Assessment</b>	<p>During the course of verification, the verification team has assessed the implemented post registration change in comparison with the Project Standard and concluded that the change fits under the category of “Appendix 1 – Temporary deviations from the registered monitoring plan or applied methodology – para 3”.</p> <p>The assessment team has checked the first ex post monitoring survey /P15/ dates for each CPA and calculated the delay occurring for each CPA. The details are given in the above table. Based on the interview with the monitoring personnel and officials, the assessment team confirmed that the reason provided by PP is accurate.</p> <p>The applied methodology for the PoA calculates the emission reductions directly and does not bifurcate into baseline and project emissions. However, the assessment team has analysed the temporary deviation as follows:</p> <ul style="list-style-type: none"> <li>Monitoring parameters which result in an increase in the emission reductions are to be considered as per para 2 of Appendix 1 of PS, V6.</li> <li>Monitoring parameters which result in a decrease in the emission reductions are to be considered as per para 3 of Appendix 1 of PS, V6.</li> </ul> <p>By applying this logic, the assessment team has concluded that the temporary deviation falls under the para 3 of Appendix 1 of PS, V6 since the delay in the <math>Q_{pj}</math> survey has affected the Lamp Failure Rate to be applied for the current monitoring period. Also, the assessment team has checked the SSC WG clarification number</p>				

	<p>"SSC 354", 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. The approach used by PP is in line with para 15 of the applied methodology and SSC 354 and does not aim to reduce the LFR, but considers the higher value among the ex-ante and ex-post LFR values for all the three years. The assessment team confirms that this is the best approach ensuring conservativeness and in compliance with para 3 of the Appendix 1 of PS, v6. Accordingly for the entire current monitoring period, the Lamp Failure Rate has been conservatively considered as the higher values from the CPA-DD and the monitoring survey. This principle has been applied for all the CPAs i.e. 3223-0002 to 3223-0021.</p>
<b>Opinion</b>	<p>The verification team confirms that this is a temporary deviation in the monitoring plan post registration changes applicable for the current monitoring period. The assessment team confirms that the monitoring report follows the para 3 of Appendix 1, PS V6 and PP has calculated the emission reductions in a conservative manner.</p>

#### Findings:

CAR-04 was raised since the  $Q_{pj}$  report was not completed for all the CPAs in accordance to para 14(i) of the methodology AMS.II.J version 03 regarding this section and converted to FAR-10. Please refer section 7 of this report.

#### Opinion:

The verification team confirms that this is a temporary deviation from the monitoring plan, which is a type of post registration change applicable to the project activity for the current monitoring period. The assessment team further confirms that the monitoring report follows the para 3 of Appendix 1, PS V6 and PP has calculated the emission reductions in a conservative manner.

### 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>, except for the temporary deviation in the monitoring parameter " $Q_{PJ}$ ," explained in section 3.4 of this report above. 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 (20 number)**

Parameter CPA UNFCCC Ref. No.	$Q_{PJ}$	$LFR_{i,y}$			N	$P_{i,BL}$	$P_{i,PJ}$	$N_{destroyed}$	$TD_y$	
		$LFR_{i,1}$	$LFR_{i,2}$	$LFR_{i,3}$				60W	2010 -11	2011 -12
3223-0002	591,506	15.68%	21.29%	31.94%	1250	60	14	701,502	17.71%	17.71%
3223-0003	596,410	14.28%	21.29%	31.94%	1250	60	14	695,766	17.71%	17.71%
3223-0004	491,777	10.65%	21.29%	31.94%	1250	60	14	500,792	17.71%	17.71%
3223-0005*	387,537	22.48%	22.48%	33.72%	1250	60	14	499,920	17.71%	17.71%
3223-0006	485,100	10.65%	21.29%	31.94%	1250	60	14	531,908	17.71%	17.71%
3223-0007	508,322	15.08%	21.29%	31.94%	1250	60	14	598,590	17.71%	17.71%
3223-0008	576,321	10.65%	21.29%	31.94%	1250	60	14	600,836	17.71%	17.71%
3223-0009	399,899	10.65%	21.29%	31.94%	1250	60	14	442,758	17.71%	17.71%
3223-0010	518,019	10.65%	21.29%	31.94%	1250	60	14	552,260	17.71%	17.71%
3223-0011	649,872	10.65%	21.29%	31.94%	1250	60	14	708,540	17.71%	17.71%
3223-0012	774,130	10.65%	21.29%	31.94%	1250	60	14	788,320	17.71%	17.71%
3223-0013	534,766	15.28%	21.29%	31.94%	1250	60	14	631,216	17.71%	17.71%
3223-0014	460,089	10.65%	21.29%	31.94%	1250	60	14	477,668	17.71%	17.71%
3223-0015	786,381	10.65%	21.29%	31.94%	1250	60	14	812,378	17.71%	17.71%
3223-0016	547,993	18.88%	21.29%	31.94%	1250	60	14	675,534	17.71%	17.71%
3223-0017	373,419	17.68%	21.29%	31.94%	1250	60	14	453,620	17.71%	17.71%
3223-0018	495,403	14.80%	21.29%	31.94%	1250	60	14	581,460	17.71%	17.71%
3223-0019	593,823	18.28%	21.29%	31.94%	1250	60	14	726,656	17.71%	17.71%
3223-0020	618,346	21.20%	21.29%	31.94%	1250	60	14	784,704	17.71%	17.71%
3223-0021	680,693	19.88%	21.29%	31.94%	1250	60	14	849,592	17.71%	17.71%

\* Ex ante LFR for CPA 3223-0005 has been estimated by linear failure rate curve prepared based on the ex post LFR (i.e. 22.48%) observed during LFR survey conducted in year 2 by PP. Refer ER Spreadsheet for the estimation.

### 3.5.1. Data/Parameter, Unit: $N_{Destroyed}$ , 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 the receipt issued by the CPA implementer to individual consumer <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 receipt issued <sup>/P25/</sup> as per unique consumer number 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>/P02c/</sup> and ER sheet <sup>/P04c/</sup> with the electronic database <sup>/P13/</sup> . Also confirmed the

	same through the cross check of ICL handing over certificate issued by the state electricity board <sup>/P11/</sup> , taking over certificate <sup>/P12/</sup> and ICL destruction certificate <sup>/P26/</sup> issued by the destruction agency for all 20 CPAs.
<i>QA/QC procedures applied</i>	The handing over of working ICLs were confirmed from the handing over certificate issued by the state electricity board <sup>/P11/</sup> . Further, the taking over of working ICLs were confirmed from the taking over certificate issued by the destruction agency <sup>/P12/</sup> . 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 taken over for destruction is verified through ICL taking over certificate <sup>/P12/</sup> issued by the destruction agency for 20 individual CPAs. The collected ICLs were completely destroyed <sup>/P26/</sup> .

#### Findings:

CAR-08 was raised and closed successfully. Please refer section 7 of this report.

#### Opinion:

The verification team checked the ICL destruction certificate issued by Kerala State Small Industries Development Corporation Limited for all CPAs <sup>/P26/</sup>. Verification team confirms that the value of parameter as mentioned in the table above in section 3.5 of this report is acceptable.

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

Number of CFLs of the group of "I" CFLs (14W CFL) in operation during the first 12 months of distribution

	<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>	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.
<i>Data collection (from data generation, aggregation, to recording, calculation and reporting)</i>	The data is recorded in receipt issued s <sup>/P25/</sup> at the time of CFL distribution to the individual household. Number of each type of CFL distributed is recorded in the receipt issued s <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.
<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>/P02c/</sup> and ER sheet <sup>/P04c/</sup> with the confirmation letter issued by CPA implementer to CME <sup>/P20a/</sup> . Also confirmed the same through the ex post monitoring survey report <sup>/P15/</sup> .
<i>QA/QC procedures applied</i>	After completion of CFL distribution activity monitoring survey was conducted by qualified and experience ISP. Monitoring survey is conducted in accordance with the requirement of methodology <sup>/B01/</sup> so that the estimate of $Q_{PJ}$ , 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>/P04c/</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.
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#### Findings:

CAR-04 was raised and converted to FAR-10. CL-05 was raised and closed successfully. All the findings are discussed in detail in section 7 of this report.

#### 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 more than the value of CFLs found installed and operating as per 1<sup>st</sup> ex post monitoring survey report<sup>/P15/</sup>. The lower value between number of ICLs collected & destroyed and CFLs found in 1<sup>st</sup> ex post monitoring survey is considered for ER calculation<sup>/P04c/</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 the receipt <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> . $P_{i, BL} = 60 \text{ W}$ (only one type of ICL is replaced )
<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 parameter in the ER spread sheet <sup>/P04c/</sup> with the values of ICLs collected as per ICL destruction certificate issued by destruction agency for individual CPAs <sup>/P10/</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 agency issued destruction certificate <sup>/P10/</sup> to verify the numbers and type of ICLs collected which is mentioned in the electronic database <sup>/P13/</sup> .

#### Opinion:

The verification team checked the ICL handing over certificate issued by State Electricity Board (KSEB) and ICL taking over and destruction certification issued by KSIDC for all CPAs<sup>/P26/</sup>. Verification team confirms that the value of parameter calculated based on values 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>
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<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 recording, calculation and reporting)</i>	The data of distributed CFLs of each type is recorded in receipt issued <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 each type of CFL distributed is taken from the number of ICLs collected and CFLs found in ex post monitoring survey is considered for ER calculation <sup>/P04c/</sup> . $P_{t,PJ} = 14 \text{ W}$ (only one type of CFL is 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>/P04c/</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 handing over certificate issued by the destruction agency for all the 20 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>/P20a/</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 receipt issued <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 receipt issued <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 receipt issued <sup>/P25/</sup> on sample basis.

#### Findings:

CAR-09 was raised and closed successfully. This is discussed in detail in section 7 of this report.

#### 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>/P04c/</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 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.



Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	No monitoring Equipment used.
Measuring/Reading/Recording frequency	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.
Data collection (from data generation, aggregation, to recording, calculation and reporting)	<p>Ex post <math>LFR_{i,y}</math> is determined by dividing the number of fused CFLs determined at the ex post monitoring survey, by the number of CFLs distributed by the project activity (<math>Q_{PJ,i}</math>) 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>.</p> <p>For the current monitoring period, the ex-post monitoring survey was not conducted within one year of CFL distribution as per the applied methodology. Hence, a temporary deviation not requiring prior approval has been requested. Since the ex-post Lamp Failure Rate is also dependent on the monitoring survey, a different but conservative approach has been applied by PP. The ex-post LFR is compared with the ex-ante LFR. The monitoring period involves three ex-ante LFR values for the corresponding periods. Taking into consideration, the clarification SSC 354, since the mortality curve has not been derived for the project activity, the ex-post LFR is compared with the ex-ante LFR and the higher among both the values is considered for emission reduction calculation. The approach used by PP is in line with para 15 of the applied methodology and SSC 354 and does not aim to reduce the LFR, but considers the higher value among the ex-ante and ex-post LFR values for all the three years. The assessment team confirms that this is the best approach ensuring conservativeness and in compliance with para 3 of the Appendix 1 of PS, v6.</p>
Verified value	As mentioned in table above in section 3.5 of this report.
Cross checks	<p>The verification team cross checked the reported data in the MR<sup>/P02c/</sup> and ER spread sheet<sup>/P04c/</sup> with the ex post monitoring survey report<sup>/P15/</sup>. The LFR observed during sampling survey as part of on-site visit is lower than the ex-ante 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.</p>
QA/QC procedures applied	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 ex post 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.

#### Findings:

CAR-06 was raised and closed successfully. This is discussed in detail in section 7 of this 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>/P04c/</sup>. Verification team confirms that the sample size of households considered by CPA implementer is appropriate. However, the CPA implementer has

temporarily deviated the timeline for conducting the 1<sup>st</sup> ex-post monitoring survey and the same was identified during the assessment. The CPA investor has requested for temporary deviation to conclude the verification of this monitoring period. The assessment team has checked the value of parameter applied as the higher value among the ex post monitoring survey and the ex ante value in the registered CPA-DDs and confirms the approach to be conservative.

### 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 most recent publicly available tariff order documents as per the web links mentioned in the ER spreadsheet <sup>/P04c/</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>/P04c/</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 calculation of parameter in the ER spread sheet <sup>/P04c/</sup> with the values of T&D losses declared by state level electricity regulatory bodies <sup>/B16/</sup> . At the time of verification/publication of MR, T&D losses figure for the year 2010-11 is 17.71%, therefore PP had considered the same. The T&D losses remains the same Verification team is in view that approved/actual figures are more appropriate than the projected figure as mentioned in the latest tariff orders.
<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 published by electricity regulatory commissions that oversee these distribution companies.

#### Findings:

CAR-07 was raised and closed successfully. This is discussed in detail in section 7 of this report.

#### 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: $EF_{CO_2,ELEC,y}, tCO_2/MWh$

CO<sub>2</sub> emission factor for displacement of electricity in the Southern Grid 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
	3223-0002 – 3223-0021	0.9027
<i>Source of value</i>	The User Guide of CDM Baseline CO <sub>2</sub> emission database by Central Electricity Authority (CEA), India(version 5.0), 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: $O_i$ , 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: $L_i$ , 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: $X_i$ , 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

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

#### Discussion:

The values of  $EF_{CO2,ELEC,y}$ ,  $O_i$ ,  $L_i$ ,  $X_i$  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:

No findings relevant to this section were raised.

#### 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 has 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)

$Q_{PJ}$	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, $Q_{PJ}$ is a constant value independent from $y$ . Under the PoA, $Q_{PJ}$ shall be obtained from the <i>ex post</i> $Q_{PJ}$ survey, which is to take place within the first 12 months of CFL distribution.
$i$	Counter for lighting device type e.g. 60W 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 20 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</sub>	ES <sub>2</sub>	NES <sub>1</sub>	NES <sub>2</sub>	NES <sub>y</sub>	
3223-0002	58.93	39.45	32,041.29	19,035.34	51,076.63	46,106
3223-0003	58.93	38.16	32,337.87	18,495.15	50,833.02	45,886
3223-0004	58.93	38.16	26,983.27	15,396.36	42,379.63	38,255
3223-0005	58.93	38.16	20,436.68	11,857.23	32,293.92	29,151
3223-0006	58.93	38.16	26,472.93	15,043.34	41,516.27	37,476
3223-0007	58.93	38.16	27,522.36	15,763.47	43,285.83	39,073
3223-0008	58.93	38.16	32,329.14	18,750.26	51,079.40	46,108
3223-0009	58.93	38.16	22,432.62	13,010.47	35,443.10	31,993
3223-0010	58.93	38.16	29,058.65	16,853.44	45,912.09	41,444
3223-0011	58.93	38.16	36,455.04	21,143.20	57,598.24	51,992
3223-0012	58.93	38.16	43,425.38	25,185.86	68,611.24	61,935
3223-0013	58.93	38.16	29,403.89	17,398.29	46,802.18	42,247
3223-0014	58.93	38.16	25,809.03	14,968.72	40,777.75	36,809
3223-0015	58.93	38.16	44,112.61	25,584.44	69,697.05	62,915

3223-0016	58.93	38.16	29,545.17	17,329.84	46,875.01	42,313
3223-0017	58.93	38.16	20,202.10	11,809.08	32,011.18	28,896
3223-0018	58.93	38.16	27,021.59	15,666.72	42,688.31	38,534
3223-0019	58.93	38.16	32,071.07	18,779.17	50,850.25	45,901
3223-0020	58.93	38.16	33,116.96	19,554.69	52,671.65	47,546
3223-0021	58.93	38.16	36,594.71	21,526.37	58,121.08	52,465
					<b>Total</b>	<b>867,045</b>

#### Findings:

CAR-06 and CAR-07 was raised and closed successfully. This is discussed in detail in section 7 of this report.

#### 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 CDM-MR-FORM, version 04 and MR is as per the valid standardized template.

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

Since, end date of the 1<sup>st</sup> monitoring period of the PoA is 31/12/2012. Hence, the total value of emission reduction achieved during the 1<sup>st</sup> monitoring period is within the first 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)	867,045	-

### 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-ILJ., 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 867,045 tCO<sub>2</sub> equivalent for the period 30/05/2010 to 31/12/2012 (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.

**Finding:**

CAR-01 was raised and closed successfully. Please refer section 7 for more details.

**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>/P04c/</sup> and monitoring report<sup>/P02c/</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>/P02c/</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 receipt issued with individual households
- Start date and end date of CFL 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.

**Finding:**

No findings relevant to this section were raised.

**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. RECOMMENDATIONS / FORWARD ACTION REQUEST**

One forward action request was raised during the current monitoring period. The verification team noted that the  $Q_{pj}$  report was completed for all the CPAs in the year 2012 and the same is not in accordance Para 14 (i) of the methodology AMS.II.J version 03. Thus, the compliance of para 14 (i) of applied methodology AMS.II.J version 03 should be verified by the verifying DOE for the next monitoring period.

## 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 30/05/2010 up to 31/12/2012 (including both dates) in the Consolidated Monitoring Report Version 01.2 (first version) dated 17/09/2013. This verification report covers 20 out of 50 CPAs included under the PoA as on 31/12/2012.

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 01.6 dated 19/09/2014. 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 01.6 dated 19/09/2014.

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 30/05/2010 up to 31/12/2012 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 01.6 dated 19/09/2014 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;

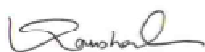
**Reporting period:** From 30/05/2010 up to 31/12/2012 (including both dates)

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

	Amount	Unit
Certified emission reductions (CERs)	867,045	tCO <sub>2</sub> e

Location: Faridabad, Haryana, India

Date: 20/09/2014



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 '01.2' dated 17/09/2013
/P02/	a. Delinked Monitoring report (Batch 2) version '01.3' dated 16/05/2014 b. Delinked Monitoring report (Batch 2) version '1.4' dated 19/08/2014 c. Delinked Monitoring report (Batch 2) version '1.5' dated 27/08/2014 d. Final Delinked Monitoring report (Batch 2) version '1.6' dated 19/09/2014
/P03/	ER Calculation spread sheet corresponding to /P01/
/P04/	a. ER Calculation spread sheet corresponding to /P02a/ b. ER Calculation spread sheet corresponding to /P02b/ c. ER Calculation spread sheet corresponding to /P02c/ d. Final ER Calculation spread sheet (Batch 2) version '1.6' dated 19/09/2014
/P05/	Verification contract between CME (BEE), CPA Implementer (EMC) and DOE (KBS Certification Services Private Limited) dated 06/05/2013
/P06/	1. Purchase Order along with technical particular issued by the Energy Management Centre to M/s. Philips Electronics (I) Limited for the supply of ISI Marked 14 watts CFL. PO Number EMC/BLY/01/2010 dated 01/02/2010  2. Purchase Order along with the technical particulars issued by the Energy Management Centre to M/s. Philips Electronics (I) Limited for the supply of ISI Marked 14 watts CFL. PO Number EMC/BLY/02/2010 dated 28/04/2010
/P07/	Work order Bachat Lamp Yojana- Collection and Disposal of Incandescent Bulbs issued by Energy Management Centre and Kerala State Small Industries Development Corporation Limited Ref No: EMC/FIN 10/BLY/T-26/I dated 23/06/2012.
/P08/	Final agreement signed between Energy Management Centre and Kerala State Small Industries Development Corporation Limited for Bachat Lamp Yojana-Collection and Disposal of Incandescent Bulbs, dated 09/07/2012
/P09/	Life test reports issued by National Physical Laboratory for 14W type Energetic CFLs of Philips Brand Ref No: 09050234/1.04/227
/P10/	Tri-partite agreements between BEE, Investors (EMC) and DISCOM for each CPA
/P11/	ICL Handing over certificate issued by Kerala State Electricity Board dated 24/03/2010

/P12/	Certificate of taking over of ICL for destruction issued by Kerala State Small Industries Development Corporation Limited dated 03/04/2014
/P13/	Copy of the electronic database for each CPA containing list of each household that receives CFLs (Consumer number's 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/	Guidelines followed by Investors (for each CPA) regarding ICL collection and CFL distribution.
/P15/	<ul style="list-style-type: none"> <li>First ex-post monitoring survey reports determining monitoring parameters "<math>Q_{PJ}</math>," and "<math>LFR_{i,y}</math>" by Datamation Consultants Pvt. Ltd, New Delhi for all 20 CPAs in Kerala State</li> </ul>
/P16/	Supportive evidences for T&D Losses: <ul style="list-style-type: none"> <li>ARR &amp; ERC of Kerala State Electricity Board 2010-11</li> </ul>
/P17/	Sample Copy of the Filled Survey Questionnaire used by surveyor during First ex-post monitoring survey
/P18/	Photographic evidence of each type of installed CFL lamps showing unique identification (logo)
/P19/	Copy of the Public notice (in local language) for the CFL distribution and installation of CFLs issued by the EMC (CPA Implementer) to the consumers located in each CPA
/P20/	a. Letter sent by EMC (CPA implementer) to BEE (CME) dated 15/09/2013 (CPA UNFCCC Ref. No. 3223-0002, 3223-0021) b. Letter sent by KSEB (Discom) to EMC (CPA implementer) dated 04/03/2011
/P21/	Training Record for persons involved in the distribution of CFLs conducted by Investors (EMC)
/P22/	Back up data for $Q_{PJ}$ , survey and first LFR for 14W CFL
/P23/	Copy of the BLY programme map of Southern, Central and Northern region of Kerala state.
/P24/	BLY implementation manual developed by CPA Implementer
/P25/	Copy of the receipt issued by the CPA implementer to the individual consumer based on the collection 2 ICLs and distribution of 2 CFLs
/P26/	Certificate for destruction of ICLs issued by Kerala State Small Industries Development Corporation Limited dated 24/06/2014

**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/	<ul style="list-style-type: none"> <li>Validation report for CDM PoA: "CFL lighting scheme – "Bachat Lamp Yojana", UNFCCC PoA project reference no 3223 dated 25/03/2010</li> <li>Validation reports for all CPAs included in the current monitoring period</li> </ul>
/B06/	<ul style="list-style-type: none"> <li>a) Clean development mechanism validation and verification standard (Version: 05 and 06.0),</li> <li>b) Clean development mechanism project standard (Version: 05 and 06.0),</li> <li>c) Clean development mechanism project cycle procedure (Version: 05 and 06.0)</li> </ul>
/B07/	E-mail from CDM Secretariat confirming the consolidated monitoring report /P01/ made publically available from 20/09/2013.
/B08/	UNFCCC project page of project reference number (3223): <a href="http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/CZ59J1XMR8K4ELUS6WY3BA0IVTGQ2F/view">http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/CZ59J1XMR8K4ELUS6WY3BA0IVTGQ2F/view</a>
/B09/	Websites referred: <ul style="list-style-type: none"> <li>a. <a href="http://cdm.unfccc.int/index.html">http://cdm.unfccc.int/index.html</a></li> <li>b. <a href="http://www.itouchmap.com">www.itouchmap.com</a></li> <li>c. <a href="http://envfor.nic.in/">http://envfor.nic.in/</a></li> </ul>
/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/	Web links for Kerala State Electricity Regulatory Commissions – <ul style="list-style-type: none"> <li>• <a href="http://www.erckerala.org/">http://www.erckerala.org/</a></li> <li>• <a href="http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf">http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf</a></li> </ul>
/B17/	Back up data of surveyed Households surveyed by verification team during on site visit.
/B18/	Guidelines completing the monitoring report form (Version 03.2)
/B19/	SSC WG clarification number SSC-354 on AMS-II.J. (Version 03)

**Key difference between webhosted MR and final MR (indicative not exhaustive)**

MR Section	Description of the change
MR Template	Version 3.1 to 3.2 to Version 4 (Refer CAR 01)
Title page	Consolidated MR to Delinked MR as per EB 75 guideline
MR section A.1	No of CPAs due to delinking of MR, ER value due to delinking
MR section A.2	Inconsistency in Geo co-ordinates as mentioned in Annexure 1
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> <li>• CPA implementation chronology as mentioned in Annexure 3,</li> <li>• Details of ICL destruction agency as mentioned in Annexure 12</li> </ul>
MR section C	<ul style="list-style-type: none"> <li>• Monitoring procedure and data flow process</li> <li>• CFL identification Logo</li> </ul>
MR section D.1	Description, Source and value applied for parameters
MR section D.2	<ul style="list-style-type: none"> <li>• Description, Source and value applied for parameters</li> <li>• QA &amp; QC procedure</li> <li>• Calculation method</li> </ul>
MR section E	Inconsistency in calculation method using correct formulae and notations
MR section E.4	ER calculation (baseline emission value deleted)
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
	08	01	01

Date	Type & Number	Raised by	Reference
19/12/2013	CAR 01	Assessment Team	CDM-D30 -Protocol
<b>Non conformities raised</b>			
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.			
<b>Project Participant's response</b>		<b>Date:</b> 29/04/2014	
The revised MR is now submitted as per the latest template available in CDM UNFCCC website.			
<b>Documentation Provided as Evidence by Project Participant</b>			
Revised MR			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 05/05/2014	
Revised MR			
<b>Reasoning for not acceptance or close out</b>			
PP has submitted the project related information in latest MR template i.e. F-CDM-MR version 3.2. The verification team has checked and confirmed that the revised MR template is the latest one available in CDM UNFCCC website. Therefore the finding is closed.			
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 05/05/2014	<b>Status:</b> <del>Closed</del> Open
<b>Non conformities raised during TR (23/06/2014)</b>			
The MR template used by the PP is not the latest version 4.0 available in CDM UNFCCC website.			
<b>Project Participant's response</b>		<b>Date:</b> 19/08/2014	
The revised MR is now submitted as per the latest template available in CDM UNFCCC website.			
<b>Documentation Provided as Evidence by Project Participant</b>			
Revised MR			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 20/08/2014	
Revised MR			
<b>Reasoning for not acceptance or close out</b>			
PP has submitted the project related information in latest MR template i.e. F-CDM-MR version 4. The verification team has checked and confirmed that the revised MR template is the latest one available in CDM UNFCCC website. Therefore the finding is closed.			
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 20/08/2014	<b>Status:</b> Closed

Date	Type & Number	Raised by	Reference
19/12/2013	CAR 02	Assessment Team	CDM-D30 -Protocol
Non conformities raised			
The section A.1 of the MR states that the CFLs distributed under the project activity would deliver at least the replaced ICL equivalent lumens as derived from the Indian national standard IS 418:2004 for ICLs. However, the technical details like the CFL range, rated lumen output and rated lifetime are not explained in accordance with the section A.1 of the Guideline : Completing the monitoring report form Version 04.0			
Project Participant's response		Date: 29/04/2014	
The required changes were made in the MR			
Documentation Provided as Evidence by Project Participant			
Test Report			
Information Verified by Team Leader		Date of review: 05/05/2014	
Test Report issued by the CFL manufacturer			
Reasoning for not acceptance or close out			
The technical details of the 14 W CFL is now transparently mentioned in the section A.1 of the revised MR. The verification team has checked the technical details from the test report issued by the CFL manufacturer and confirmed the same as appropriate. Therefore the finding is closed.			
Date of acceptance or non-acceptance		Date: 05/05/2014	Status: Closed

Date	Type & Number	Raised by	Reference
19/12/2013	CAR 03	Assessment Team	CDM-D30 -Protocol

### Non conformities raised

CPA Number	Date of CFL distribution as per CPA DD		Date of CFL distribution as per letter from KSEB to EMC dated 04/03/2011		Date of CFL distribution as per webhosted MR	
	Start	End	Start	End	Start	End
3223-0002	16/03/2010	30/06/2010	16/03/2010	30/06/2010	16/03/2010	30/07/2010
3223-0003	16/03/2010	30/06/2010	16/03/2010	30/06/2010	16/03/2010	30/07/2010
3223-0012	Kannur Circle - 19/06/2010 Kalpetta Circle- 05/06/2010	15/09/2010	Kannur Circle - 19/06/2010 Kalpetta Circle- 05/06/2010	15/09/2010	05/06/2010	15/09/2010
3223-0015	Kasargod Circle- 27/06/2010 Sreekandpu ram Circle – 21/06/2010	15/09/2010	Kasargod Circle- 27/06/2010 Sreekandpu ram Circle – 21/06/2010	15/09/2010	21/06/2010	15/09/2010
3223-0019	Pala Circle - 28/04/2010; Thodupuzha Circle - 26/03/2010	Pala Circle – 31/07/2010; Thodupuzha Circle - 31/07/2010	Pala Circle - 28/04/2010; Thodupuzha Circle - 26/03/2010	Pala Circle – 31/07/2010; Thodupuzha Circle - 31/07/2010	26/03/2010	31/07/2010

From the above table it is clear that there are some inconsistency between the start date and end of CFL distribution date mentioned for the respective CPAs in the MR, CPA DD and the letter issued by KSEB to EMC.

Whilst the start date and end of CFL distribution date of the above mentioned CPAs were known to the PP before the date of registration of CPA DD, the inconsistency on the dates between the documents has to be justified with proper evidence CDM PS Version 5.0 (Cp § 17).

#### Project Participant's response

Date: 29/04/2014

For CPA 3223-0002 and CPA 3223-0003, the date of CFL distribution as per webhosted MR is wrongly typed as 30/07/2010 and the correct date was 30/06/2010. KSEB has 23 Circle office covering the entire State. Based on the consumer strength, these 23 KSEB Circles were grouped into 20 CPA. The 3 grouped Circles are Kannur & Kalpetta, Kasagod & Sreekandapuram and Pala & Thodupuzha, which has common boundaries. When these grouped Circles were considered, the start date of the CFL distribution is the first starting date among these two Circles and closing date is the last date among these Circles.

#### Documentation Provided as Evidence by Project Participant

Letter from KSEB to EMC Kerala dated 04/03/2011

#### Information Verified by Team Leader

Date of review: 05/05/2014

Letter from KSEB to EMC Kerala dated 04/03/2011

#### Reasoning for not acceptance or close out

PP has confirmed that the CFL start and end dates were wrongly mentioned in the MR. The validation team has checked the revised MR with the Letter from KSEB to EMC dated 04/03/2011 and also with the EMC BLY electronic database and confirmed that the dates are mentioned in appropriate manner. Therefore, the finding is closed.

#### Date of acceptance or non-acceptance

Date: 05/05/2014

Status: Closed

Date	Type & Number	Raised by	Reference
19/12/2013	CAR 04	Assessment Team	CDM-D30 -Protocol

### Non conformities raised

The verification team noted that the Q<sub>pi</sub> survey was not completed on the time line mentioned in the registered CPA DD and Para 14 (i) of the methodology AMS.II.J version 03 most of the CPAs. Further, the

verification team identified that the survey dates (10/03/2011 for the CPAs 3223-0002 to 0007, 01/04/2011 for the CPAs 3223-0016-0021 and 15/04/2011 for the CPAs 3223-0008-0015) mentioned in the MR & ER spreadsheet is not consistent with the dates mentioned in the back-up data of Q<sub>pi</sub> survey.

Thus, PP has to provide justification for the delay in the timeline of Q<sub>pi</sub> survey in accordance to registered CPA DD and Para 14 (i) of the methodology AMS.II.J version 03 and also, PP is requested to correct the inconsistency of survey dates between the MR & ER spreadsheet and back-up data of Q<sub>pi</sub> survey.

**Project Participant's response**

**Date:** 29/04/2014

The survey dates mentioned in the back-up data of Q<sub>pi</sub> survey is correct. The survey dates mentioned in the revised MR are now made consistent with the back-up data of Q<sub>pi</sub> survey. Further, we wish to clarify that the date of QPJ survey was initially planned for 10/03/2011 for the CPAs 3223-0002 to 0007, 01/04/2011 for the CPAs 3223-0016-0021 and 15/04/2011 for the CPAs 3223-0008-0015. EMC is involved as a CPA implementer and investor for CDM BLY PoA. However, the approval for the investment required in conducting the Q<sub>pi</sub> survey has to be sanctioned by Power Department of Kerala. As the investment for the Q<sub>pi</sub> survey involved in the project is huge, the Power Department of Kerala delayed the approval for one year from the date of registration. Otherwise the Q<sub>pi</sub> survey were actually planned to start before the project registration. By considering the fact that Q<sub>pi</sub> survey of MP 1 was conducted in a delayed manner, we had already taken precautionary measures to complete the Q<sub>pi</sub> survey of MP 2 as per the scheduled time frame and in compliance with the Para 14 (i) of the methodology AMS.II.J version 03. In this case, investor is requesting a temporary deviation for the first Q<sub>pi</sub> survey dates.

**Documentation Provided as Evidence by Project Participant**

CPA DD & MR

**Information Verified by Team Leader**

**Date of review:** 05/05/2014

CPA DD & MR

**Reasoning for not acceptance or close out**

PP as a response explained that the delay in the Q<sub>pi</sub> survey as given in the table below, is mainly due to the investment involved in conducting the Q<sub>pi</sub> survey.

CPA UNFCCC Ref. No.	CFL distribution end date	Date of completion of one year	First Ex-post Monitoring Survey End date	Extent of deviation in days
3223-0002	30/06/2010	30/06/2011	31/07/2011	31
3223-0003	30/06/2010	30/06/2011	31/07/2011	31
3223-0004	15/07/2010	15/07/2011	26/10/2011	103
3223-0005	15/07/2010	15/07/2011	09/08/2011	25
3223-0006	30/06/2010	30/06/2011	01/02/2012	216
3223-0007	30/06/2010	30/06/2011	02/12/2011	155
3223-0008	15/09/2010	15/09/2011	08/08/2011	-
3223-0009	15/09/2010	15/09/2011	08/08/2011	-
3223-0010	15/09/2010	15/09/2011	05/10/2011	20
3223-0011	15/09/2010	15/09/2011	15/01/2012	122
3223-0012	15/09/2010	15/09/2011	21/12/2011	97
3223-0013	15/09/2010	15/09/2011	05/10/2011	20
3223-0014	15/09/2010	15/09/2011	05/10/2011	20
3223-0015	15/09/2010	15/09/2011	21/12/2011	97
3223-0016	31/07/2010	31/07/2011	28/07/2011	-
3223-0017	31/07/2010	31/07/2011	18/12/2011	140
3223-0018	31/07/2010	31/07/2011	27/11/2011	119
3223-0019	31/07/2010	31/07/2011	09/08/2011	9
3223-0020	31/07/2010	31/07/2011	18/12/2011	140
3223-0021	31/07/2010	31/07/2011	01/10/2011	62

PP has confirmed that the next Q<sub>pi</sub> survey will be conducted as per scheduled time frame and in compliance with the Para 14 (i) of the methodology AMS.II.J version 03. Further, they have requested a temporary deviation for the current monitoring period. Based on the interview with the monitoring personnel the assessment team confirmed that the reason provided for the delay in the Q<sub>pi</sub> is mainly due to huge investment and thus the temporary deviation provided by the PP is acceptable. Therefore the finding is

closed. However, the assessment team has raised a FAR 10 to avoid such deviation in the next monitoring period. Also, post registration changes – ‘Temporary deviation to the registered monitoring plan’, without prior approval will be submitted with the request for issuance for the current monitoring period. Please refer section 3.4 of this report for more details.

<b>Date of acceptance or non-acceptance</b>	<b>Date:</b> 05/05/2014	<b>Status:</b> Converted to FAR-10
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<b>Date</b>	<b>Type &amp; Number</b>	<b>Raised by</b>	<b>Reference</b>
19/12/2013	CL-05	Assessment Team	CDM-D30 -Protocol

#### **Non conformities raised**

The evaluation form used for the first monitoring survey does not have a provision to know the reason for the failure of CFL. However, the Annex-1 of the applied methodology AMS II.J version 03 has prescribed the same as a Generic information for conducting the first monitoring survey.

Thus, PP has to explain the basis about the consideration of necessary local circumstances to conduct the first monitoring survey.

**Project Participant's response** **Date:** 29/04/2014

During the survey the investigator enquired about the failure of CFL and in most of the cases, the failure was due to quality related issues. The third party organization has concluded the overall reason for failure of CFLs in the Qpj survey report.

#### **Documentation Provided as Evidence by Project Participant**

Qpj Survey Report

**Information Verified by Team Leader** **Date of review:** 05/05/2014

Qpj Survey Report

#### **Reasoning for not acceptance or close out**

PP has clarified that the personnel conducting the interview during the monitoring survey have enquired about the reason for failure of CFLs. They also confirmed the conclusion of the Qpj survey report includes the reason of the failure of CFLs. The assessment team has checked the Qpj survey report and confirmed that the overall feedback from consumers was positive. However, a small fraction of the consumers had dissatisfaction regarding the no. of CFLs provided through this scheme as well as the lack of quality of the CFLs.. Since the Qpj survey has concluded the reason for failure of CFLs, the assessment team confirms that the Qpj survey is in accordance with Annex-1 of the applied methodology AMS II.J version 03. Therefore the CL is closed.

**Date of acceptance or non-acceptance** **Date:** 05/05/2014 **Status:** Closed

<b>Date</b>	<b>Type &amp; Number</b>	<b>Raised by</b>	<b>Reference</b>
19/12/2013	CAR-06	Assessment Team	CDM-D30 -Protocol

#### **Non conformities raised**

The CER spread sheet indicates that the Ex-Post Lamp Failure Rate for CFL of type "i" in year y are calculated from survey findings (LFR1i). However, the LFR rate of 13.31% (CPA No: 3223-0002), 12.04% (3223-0003), 0.02% (CPA No: 3223-0004), 21.35% (CPA No: 3223-0005), 8.15% (CPA No: 3223-0006), 12.97% (CPA No: 3223-0007), 2.89% (CPA No: 3223-0008), 6.46% (CPA No: 3223-0009), 6.04% (3223-0010), 7.10% (CPA No: 3223-0011), 0.52% (3223-0012), 1.60% (3223-0013), 2.77% (3223-0014), 1.87% (3223-0015), 18.50% (3223-0016), 16.99% (3223-0017), 13.41% (3223-0018), 15.46% (3223-0019), 20.58% (3223-0020), 17.76% (3223-0021) calculated in the CER spread sheet is lesser than the LFR rate mentioned in the Table 3.5 (Page 14) : Current status of CFL of the first monitoring survey report. Thus PP has to justify the conservativeness of considering the LFR rate for calculating the net energy savings.

**Project Participant's response** **Date:** 29/04/2014

The installation of all the CFLs has got completed on 30/06/2010 & 15/09/2010 respectively, however as per the CPA DD the LFR was considered in accordance to the start date of crediting period. The start date of crediting period was considered as per date of inclusion of each CPA DD, out of the 20 CPAs, 1 CPA was included on 26/04/2011 and the remaining 19 CPAs were included on 06/05/2011. By considering the inclusion of each CPA, the LFR rates are also applied with respect to the year wise calculation in the CPA DD. The LFR rates were considered in a conservative manner by taking the maximum value of the LFR based on the comparison of values between Qpj Survey and CPA DD. The calculation in the ER spreadsheet are now corrected and the same is submitted for reference.

#### **Documentation Provided as Evidence by Project Participant**

Revised ER Spreadsheet		
Information Verified by Team Leader	Date of review: 05/05/2014	
Revised ER Spreadsheet		
Reasoning for not acceptance or close out		
The revised LFR values applied in the ER spreadsheet ensure that the higher LFR value among the ex post monitoring survey and CPA-DD has been applied to the ER calculations. Also, the LFR values have been applied year-wise considering the end date of CFL distribution. This revised approach has been checked by the assessment team and confirms to be the most conservative option. Hence, CAR is closed.		
Date of acceptance or non- acceptance	Date: 05/05/2014	Status: <del>Closed</del> -Open
Non conformities raised during TR (dated 25/08/2014)		
a) The CER spread sheet indicates that the Ex-ante Lamp Failure Rate for CFL of type "i" in year 2 and year 3(i.e. 21% and 32%) is not accurately mentioned upto 2 decimal places. PP to mention the calculated value of Ex ante LFR upto 2 decimal places.		
b) PP to justify the conservativeness of LFR considered for year 3 for CPA 3223-0005 with respect to para 15 of methodology.		
Project Participant's response	Date: 15/09/2014	
a) Value of Ex ante LFR is now estimated as per the formula presented in AMS-II.J. (ver 03) and is now presneted upto two decimal points for year 1, year 2 and year 3.		
b) Since, Ex post LFR is higher then the Ex ante LFR for year 2 for CPA 3223-0005, LFR for this CPA is estimated based on linear failiure rate curve values, derived based on Ex post LFR observed during 1st Ex post moniotirng survey conducted by PP in year 2. Same is now mentioned in ER spreadsheet.		
Documentation Provided as Evidence by Project Participant		
Revised ER Spreadsheet		
Information Verified by Team Leader	Date of review: 16/09/2014	
Revised ER Spreadsheet		
Reasoning for <del>not acceptance or</del> close out		
a) The LFR values are now estimated as per the formula given in applied methodology and is presented upto 2 decimal points for clarity and comparison with Ex post LFR. Hence, this CAR is closed.		
b) PP has now estimited Ex ante LFR for all 3 years for CPA 3223-0005 based on the linear failiure rate curve as presented in ER spreadsheet. This is in line with the para 15 of applied methodology (AMS-II.J., version 03). Hence this CAR is cloosed.		
Date of acceptance or non- acceptance	Date: 16/09/2014	Status: Closed

Date	Type & Number	Raised by	Reference
19/12/2013	CAR-07	Assessment Team	CDM-D30 -Protocol
<b>Non conformities raised</b>			
The T&D loss considered for all the CPAs is 18%. However, the same value is not available from the supporting evidence (KSEB ARR & ERC for 2010-11) and the submitted evidence is also not the recent audited data published either by the DISCOM.			
Thus, PP has to justify that the T&D losses considered for calculating the net energy savings is accurate and the same has to be supported with appropriate evidence in accordance to the CDM PS Version 5.0 (Cp § 16 & 17).			
<b>Project Participant's response</b>		<b>Date:</b> 29/04/2014	
As per the latest approved ARR filed by the KSEB to Kerala State Electricity Regulatory Commission, the T&D loss is 17.71%. The value considered as per the latest data available in KSERC website and the same value is considered in the CPA DD of all CPAs. The weblink for the same is now included on the revised MR.			
<b>Documentation Provided as Evidence by Project Participant</b>			
<a href="http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf">http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf</a>			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 05/05/2014	
<a href="http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf">http://www.erckerala.org/userFiles/634329591805310000_ARR%202011-12.pdf</a>			
<b>Reasoning for not acceptance or close out</b>			
The T&D losses considered by PP is the latest officially available data, hence confirmed to be appropriate by the assessment team. CAR is closed.			
<b>Date of acceptance or non- acceptance</b>		<b>Date:</b> 05/05/2014	<b>Status:</b> Closed



Date	Type & Number	Raised by	Reference
19/12/2013	CAR-08	Assessment Team	CDM-D30 -Protocol
<b>Non conformities raised</b>			
The Annexure -3 of MR clearly indicates the date of destruction of ICLs for all the 20 CPAs and the Annexure-6 indicates the number of ICLs destructed. However, during site visit the verification team noted that all the workings ICLs that have been collected, were kept on hold by the KSEB circle office without destruction. Thus, PP has to provide justification in terms accuracy and correctness of information related to the number of ICLs destruction and date of ICLs destruction.			
<b>Project Participant's response</b>		<b>Date:</b> 29/04/2014	
Copy of the handing over certificate is enclosed for reference. The photograph showing the distraction is also enclosed. The ICL destruction work is in progress. As with the Q <sub>pi</sub> survey, the approval for the investment required in ICL destruction has to be sanctioned by Power Department of Kerala. As the investment involved in destruction of ICLs in the project is huge, the internal communication process in the Power Department of Kerala has delayed the approval.			
<b>Documentation Provided as Evidence by Project Participant</b>			
ICL handing over and Taking over certiifcate ICL destruction certificate			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 05/05/2014	
ICL handing over and Taking over certiifcate ICL destruction certificate			
<b>Reasoning for not acceptance or close out</b>			
The handing over certificate issued by the State Electricity Board to the destruction company,the taking over certificate and ICL destruction certificate issued by the ICL destruction company has been submitted by the PP. The assessment team has compared the number of ICL mentioned in the handing over certificate and taking over certificate with the original ICL collection database and confirmed that the numbers are identical. The ICL destruction certificate refers to the taking over certificate and confirms that the number of ICLs taken over by the ICL destruction company have been completely destroyed. Hence, this CAR is closed.			
<b>Date of acceptance or non-acceptance</b>		<b>Date:</b> 05/05/2014	<b>Status:</b> Closed

Date	Type & Number	Raised by	Reference
19/12/2013	CAR-09	Assessment Team	CDM-D30 -Protocol
<b>Non conformities raised</b>			
The number of CFL distribution data provided in the Annexure 6 and ICL collection data provided in the Annexure -9 of the MR is not exactly the same as per the data available in the BLY Electronic database and Original ledger maintained at the KSEB circle office.			
Thus, PP has to substantiate the accuracy, consistency and completeness of the monitored data in accordance to the CDM PS Version 5.0 (Cp § 16, 17 & 18).			
<b>Project Participant's response</b>		<b>Date:</b> 29/04/2014	
The inconsistency in the number of CFL distributed and the number of ICL collected are now corrected in the revised MR. The number of CFL distributed and the number of ICL collected are exactly the same as available in the BLY Electronic database and Original ledge . Only 14 W CFL was distributed against the working 60 W ICL. EMC has reported the details of CFL distributed to the CME (BEE) along with the closing dates and BEE has accepted the same. The ICL handing over certificate from KSEB is also enclosed for cross reference.			
<b>Documentation Provided as Evidence by Project Participant</b>			
Copy of the letter from EMC to BEE & ICL handing over certificate is enclosed.			
<b>Information Verified by Team Leader</b>		<b>Date of review:</b> 05/05/2014	
Copy of the letter from EMC to BEE & ICL handing over certificate is enclosed			
<b>Reasoning for <del>not acceptance or</del> close out</b>			
PP as a response has corrected all the inconsistency in the number of CFL distributed and ICL collected. The verification team has checked the number of CFL distributed and number ICL collected from the original electronic database of BLY and the same numbers were cross checked from the letter forwarded by EMC to BEE. Therefore the finding is closed.			
<b>Date of <del>acceptance or non-acceptance</del></b>		<b>Date:</b> 05/05/2014	<b>Status:</b> Closed

Date	Type & Number	Raised by	Reference
05/05/2014	FAR-10	Assessment Team	CAR04
<b>Non conformities raised</b>			
The verification team noted that the Q <sub>pi</sub> report was completed for all the CPAs in the year 2012 and the same is not in accordance Para 14 (i) of the methodology AMS.II.J version 03. Thus, the compliance of para 14 (i) of applied methodology AMS.II.J version 03 should be verified by the verifying DOE for the next monitoring period.			



## 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>B. Rampradap</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	
Energy Demand		TA 3.1 Energy Demand	
Waste handling and disposal		TA 13.1: Waste handling and disposal	
Approved by (Manager C & T)		Mayank Jain	
Approval date:		09/05/2013	

<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
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<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>Sameer Zope</b>	
<b>Qualified to work as:</b>			
Team Leader	<input type="checkbox"/>	Technical Expert	<input 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>	
N/A		N/A	
Approved by (Manager C & T)		Mayank Kumar Jain	
Approval date:		24/05/2012	

<b>Personnel Name:</b>		<b>Megha Lotankar</b>	
<b>Qualified to work as:</b>			
Team Leader	<input type="checkbox"/>	Technical Expert	<input type="checkbox"/>
Validator/Verifier (Trainee)	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" 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>	
Not applicable		Not applicable	
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-		TA 1.2: Energy generation from renewable energy	

renewable sources)	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**

**Field Survey Form PoA- 3223 (BLY PoA DOE verification)**

SSC-CPA Unique Identification No: - (UN Ref No.) 3223 - \_\_\_\_\_

KBS Reference Number: CDM.13.VER.004

Name of DISCOM:

CIRCLE, DIVISION:

Name(s) of the verification team members who collected the following information:	Place:
	Date:

Name of the household consumer of the utility	
Address of the surveyed household	
Household unique utility consumer number	
Name of the dweller/ interviewee	
Age of the interviewee	
Status of the dweller (Owner/Tenant/Other)	

SL.	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					
3	Number of ICL replaced by the CFL(s)	1	2	3	4	>4
	Wattages(W) of ICL replaced					
4	The project CFLs are having BLY logo & CPA implementer logo	YES/ NO				
5	Type of distribution	Direct		Indirect		
	Mention the method of distribution of CFL(s) & awareness promotion	NA				
	It had been told to install in high usage area of the house			YES/ NO		
6	The household has paid INR 15 for exchanging 1 ICL(in operation) with 1 CFL (new)	YES/ NO				
7	The electricity bill of the household has also been stamped during CFLs distribution by the authority	YES/ NO				

**Field Survey Form PoA- 3223 (BLY PoA DOE verification)**

8	Project CFL(s) flickers	YES/ NO					
9	Project CFL(s) found in operation during this site visit(11W/14W/18W/20W)	Number					
		Wattage (W)					
10	All of the installed project CFLs were operating	YES	NO (Number:                      W:-                      )				
	Reason of failure	NA	Defective	Poor performance	In reserve	Sold/ given away	Others
	Defective CFL(s) was replaced by the household		NO	YES			
	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						
11	Who has collected the fused CFL?						
12	When was the fused CFL collected?						
13	What is the disposal mechanism of fused CFL lamps?						
14	Compliance of leakage	YES/NO					
15	Additional information (if any)						

Signature of the dweller/ interviewee:	Signature of the auditor:

## Annexure -2

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

#### Field Survey Form PoA- 3223 (BLY, PoA DOE verification)

SSC-CPA Unique Identification No:- 021-EMC-KL (UN Ref No.) 3223 -0002

KBS Reference Number: CDM.13.VER.004

Name of DISCOM: **KSEB**

CIRCLE, DIVISION: **Thiruvananthapuram**

Name(s) of the verification team members who collected the following information: <b>B. RAM PRADIP</b>	Place: <b>Trivandrum - Urban</b> Date: <b>19/10/2013</b>
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Name of the household consumer of the utility	<b>SALMA BEEVI</b>
Address of the surveyed household	<b>Menalatha vilakom Kazhahuttom Thiruvanthapuram - ASA 40</b>
Household unique utility consumer number	<b>3975</b>
Name of the dweller/ interviewee	<b>Monesh</b>
Age of the interviewee	<b>25</b>
Status of the dweller (Owner/Tenant/Other)	<b>Tenant</b>

SL.	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	14W	14W			
3	Number of ICL replaced by the CFL(s)	1	2	3	4	>4
	Wattages(W) of ICL replaced	60W	60W			
4	The project CFLs are having BLY logo & CPA implementer logo	YES/ NO				
5	Type of distribution	Direct				
	Mention the method of distribution of CFL(s) & awareness promotion	Indirect				
	It had been told to install in high usage area of the house	NA				
		Handled over ICLs at KSEB collection centre and collected				
		YES/ NO				
6	The household has paid INR 15 for exchanging 1 ICL(in operation) with 1 CFL (new)	YES/ NO				
7	The electricity bill of the household has also been stamped during CFLs distribution by the authority	YES/ NO				



Field Survey Form PoA- 3223 (BLY PoA DOE verification)

8	Project CFL(s) flickers	YES/ NO <input checked="" type="checkbox"/>					
9	Project CFL(s) found in operation during this site visit(11W/14W/18W/20W)	Number	1	2			
		Wattage (W)	14	14			
10	All of the installed project CFLs were operating	YES <input checked="" type="checkbox"/>	NO (Number: W:- )				
	Reason of failure	NA <input checked="" type="checkbox"/>	Defective	Poor performance	In reserve	Sold/ given away	Others
	Defective CFL(s) was replaced by the household	NO <input checked="" type="checkbox"/>	YES				
	Replacement lamp type installed by household in place of fused CFL(s)	NA <input checked="" type="checkbox"/>	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						
11	Who has collected the fused CFL?						
12	When was the fused CFL collected?						
13	What is the disposal mechanism of fused CFL lamps?						
14	Compliance of leakage	YES/NO N.A					
15	Additional information (if any)						

Signature of the dweller/ interviewee:

*[Signature]*

Signature of the auditor:

*[Signature]*



#### 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